STEEL

The

Metalworking Weekly

OCTOBER 24, 1960

A PENTON PUBLICATION

AMA Study Will Help You Review Your People Power Requirements

Belt Grinding Technique Opens Market for Superquality Strip

Army Microfilm System Speeds Filing, Retrieving; Cuts Clerical Costs 40%

Capacity Buildup Triggers Price Fighting in Aluminum Extrusions

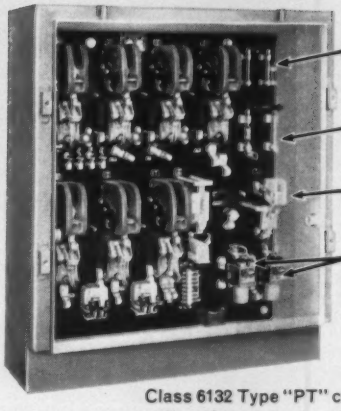
CONTENTS—TURN PAGE

MATERIALS EFFICIENCY

How to Build a Materials Team

Good teamwork is essential for best results in purchasing, inventory control, production control, engineering, research, and a program dedicated to meeting the requirements of customers, says Worthington Corp.'s David S. Gibson. For tips on the approach, see Page 73.

NOW! LOW-COST MAGNETIC CONTROL FOR DC CRANES



Class 6132 Type "PT" controller with self-contained protection

Compact ***EC&M Type "PT" Control*** *—a logical replacement for manual control*

• On any DC crane application up to 55 hp, 230 volts, you now can have all the advantages of *full magnetic* control where manual control formerly was purchased purely on the basis of price. Whether you're modernizing existing cranes or ordering new ones, you'll find type "PT" control far superior to manual control.

Space Saving • compact controllers fit easily in crane cabs, on crane walkways and in congested areas for other mill applications. Front connection permits mounting against walls or girders.

Full Protection • *now* available with self-contained undervoltage and overload protection. Also supplied without protection for use with separate protective panel.

Extra Safety • Exclusive Wright dynamic lowering circuit is the simplest and safest circuit for crane hoist service, gives maximum hook speed without danger of overspeeding. Controller completely enclosed.

Automatic Acceleration • relays adjustable from 0.2 second or more per step. Automatic acceleration reduces wear on motors and control.

Plugging Protection • rectifier-type plugging relay operates from motor counter-emf.

Choice of Master Switches • dynamic lowering controllers furnished with 4-point speed control. Choice of 3 or 4 point master switches on reversing plugging controllers.

Heavy-Duty Construction • mill-type contactors, sturdy design throughout make Type "PT" control suitable for mill accessory drives as well as light industrial cranes. Available in NEMA Type 1 general purpose, Type 1 gasketed, or NEMA Type 3 weatherproof enclosures.

Write for Bulletin 6132 for details on "PT" control with protection

SQUARE D COMPANY

EC&M DIVISION • CLEVELAND 28, OHIO

wherever electricity is distributed and controlled

4155

This Week in STEEL
The Metalworking Weekly

October 24, 1960 Vol. 147 No. 17

Steel Companies Step Up Their Marketing Pace

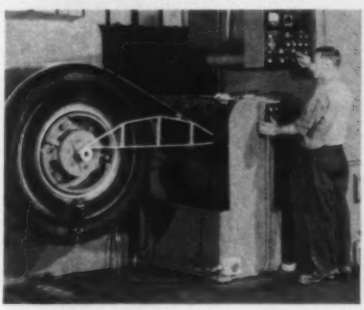
Eighteen steel companies exhibiting at this year's Metal Show placed emphasis on new markets. During the show, STEEL conducted a straw poll in which the metalworkers indicated by a wide margin they think Richard M. Nixon is better qualified than John F. Kennedy to lead our economy. PAGE 63

How Effectively Are You Using Your 'People Power'?

You can get an idea from a new study revealed by the American Management Association. It polled top metalworking firms, getting a breakdown of the proportion of total employment required for the basic functions of administration, manufacturing, research and development, and marketing. The wide variations prove that many firms can do much to streamline operations by better use of people. PAGE 65

Grinding Opens New Strip Market

Careful strip rolling and new techniques in abrasive belt grinding enable Wallingford Steel Co. to turn out foil thin, stainless strip holding tolerances of ±3 per cent on 0.001 in. thick material. The aircraft and missile industries have been clamoring for such strip for at least four years. Now that the problem has been solved, Wallingford will seek markets for its precision strip on a big scale. PAGE 98



Microfilm System Keeps Up with Space Program Needs

If you're running out of storage space for blueprints and drawings and finding it difficult to locate ones wanted in a hurry, you might want to take a look at what the Army is doing at its Redstone Arsenal. It set up a microfilm-punched card system that provides fast reference to more than 850,000 drawings in the active file and about 1.5 million in the historical file. Savings run into thousands of dollars annually. PAGE 102

Extruders Fight Uphill Battle

Intense competition brought on by too much capacity in the aluminum extrusion field has resulted in price fighting that has reached an all-time high. It's fine for the buyer except in a few instances where quality has suffered (corners have been cut by some extruders to stay in the black). The potential for aluminum extrusions has hardly been scratched. The key to growth is to put prices on a sound basis. PAGE 135

COMPLETE CONTENTS ▶

CONTENTS

Metalworking Week, Page 53

The Editor's Views—Question from Germany ..... '59
Steel Companies Step Up Their Marketing Pace 63
How Effectively Are You Using Your "People Power"? 65
Puerto Rico Woos U. S. Industry—Many incentives offered 66
Steel Founders' Society Trains Managers for Its Members 67
Magnesium Mill Product Shipments Will Be Down 10-20 Per Cent 68
Aluminum Has New Entry in Can Race—It's coated, seamless 69
Materials Efficiency—How to Build a Materials Team 73
No. 22 in STEEL's Program for Management for 1960
Kellogg Turns Out Stainless Piping on Production Basis 92

Technical Outlook, Page 97

Grinding Opens New Strip Market—Some brings over $37,000 a ton 98
Transfer Line Makes Better Wheels—Output: One every 75 seconds 100
Microfilm System Keeps Up with Space Program Needs 102
Machine Topics—Hard Sell Abroad Pays Off 104
Progress in Steelmaking—Three Way System Analyzes Blast Furnace Top Gases—Percentages recorded on same strip chart 106
New Brazing Technique Solves Fitup Problem—Two alloys used .. 110
Burnishing Rollers Lead Double Life—Reground for more service .. 113
Assembly of Tiny Memory Cells Speeded by Specials 116

Market Outlook, Page 133

Complete Index to Market News and Prices 133
Extruders Fight Uphill Battle—Some firms operating in red 135
Blough Expecting Pickup in Steel This Quarter 138
Nine-Month Steel Output Is Fifth Best on Record 139
Steelworks Operation Chart and District Ingot Rates 140
Scrap Prices Lack Buying Test—Exports provide some support 153
Nonferrous Metals—Users to Continue Inventory Cutbacks 156
Scrapmen Start Fight on Proposed Rail Rate Hike 159

WHERE TO FIND

Servicenter 5
Calendar of Meetings 10
Editorial & Business Staffs 16
Metalworking Pulse 56
Windows of Washington .. 70
Mirrors of Motordom 79
The Business Trend 83
Men of Industry 87
Obituaries 90
New Products 119
New Literature 131
Advertising Index 161

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We baby these sheets to do a man's job

Here goes a coil of Bethlehem sheets, sinewed to stand up under rugged duty, as only steel can. To bring sheets to this superlative condition, Bethlehem pampers them like a newborn babe.

From open hearth to shipping room, their progress is checked under the watchful eyes of man and X-ray. Slabs are expertly scarfed. Reheating is controlled by the latest scientific instruments. Rolling and coiling temperatures are carefully controlled.

The finished sheet—whether hot-rolled or sent through the 10 additional steps of cold-rolling—is the result of meticulous care all along the way. You can *always* count on Bethlehem sheets to do a man's job! Put them to the test in your plant.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

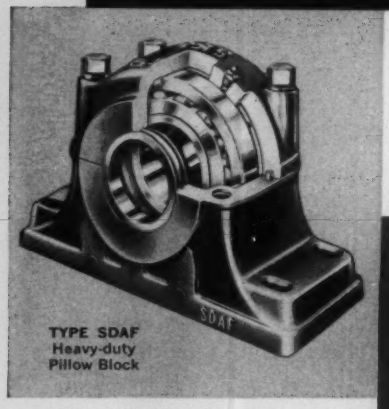
Export Sales:
Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

TYPE SAF
Ball or Spherical Roller
Bearing Pillow Block

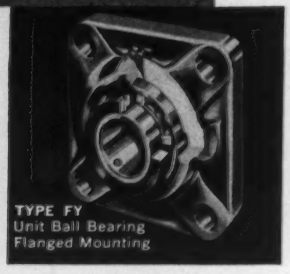
Can you get these "special" qualities in "standard" pillow blocks?



TYPE SDAF
Heavy-duty
Pillow Block

TYPE SY
Unit Ball Bearing
Pillow Block

TYPE SES
Unit Rubber-flex Ball
Bearing Pillow Block



TYPE FY
Unit Ball Bearing
Flanged Mounting

Most pillow blocks offer easy assembly and rugged housings. But can they offer you low friction, self-aligning bearing operation and efficient sealing as well?

They can—if they're the SKF pillow blocks, and flanged mounting, shown here. Type SAF, for example, comes equipped with low-friction ball or spherical roller bearings that are *inherently* self aligning. And these bearings are effectively protected by Triple-Seal rotating rings. Abrasives and corrosives can't get to them—oil or grease can't drip out.

Yet this is a standard SKF pillow block, that is competitively priced in spite of its combination of extra features. We make it for shaft sizes from ¾" to 10½", for mounting directly or with an adapter. A cast steel housing (SAFS) is available for heavy duty applications.

For details, call one of our twenty-four offices. 5938

Spherical, Cylindrical, Ball, Timken® Tapered and REED Miniature Bearings

EVERY TYPE—EVERY USE

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Bottom: R. W. Leigh, Vice President—Sales; top, l. to r.: R. H. Ingersoll, Steel Sales Engineer; G. M. Poole, Chief Metallurgist

Lay your saw steel problems on our doorstep

Ingersoll specializes in the melting and *cross-rolling* of metal and wood cutting saw steels for just about any purpose you can name. For power and hand hack saw blades; for circular saws (blanks to 72" in diameter); for slotting and slitting saws; and for many other types. In carbon, chromium, nickel, chromium-nickel, chromium-vanadium, chromium-nickel-molybdenum, low alloy metal cutting, and high speed (tungsten and tungsten-moly) grades. We maintain in-plant stocks for prompt service. And we provide expert metallurgical assistance to make sure you get the right kind of saw steel for your requirements. If you have a saw steel problem, lay it on our doorstep. Meantime, write for Ingersoll's new full-color brochure "*Experts in Specialty Steels.*"

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At Sandvik, the latest scientific research and quality control techniques constantly improve and protect spring steel quality.

This is part of the reason why Sandvik steels have the special physical stamina to give consistent performance in such critical applications as flapper valves, instrument springs, shock absorbers, surgical instruments, unbreakable watch mainsprings, piston ring segments and expanders, etc.

Sandvik stocks a wide variety of grades and sizes of cold rolled specialty strip steels. For information on leading types, send for this free brochure.

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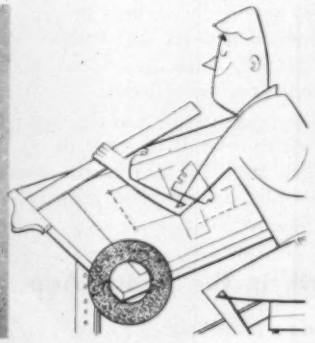
Filling a Void

"Somehow I missed your Sept. 5 issue, 'Our Fight for Survival in New World Market,' " writes Guy C. Close Jr., Aluminum Co. of America, Vernon Works, Los Angeles. "If there is one reprint left, I would appreciate a copy. In November, I am scheduled to address the manager group of Stauffer Chemical Co. on the theme on my new book, *Work Improvement*. I am sure your material would lend depth to my presentation."

On The Spot Usership



The July 25, 1960, advertisement by Norton Co., Worcester, Mass., carried illustrations of the company's abrasives that came in handy for two STEEL readers (and users).

Lauri A. Lakso, designer, turbines and components, General Electric Co., Fitchburg, Mass. wrote: ". . . I touched the picture on Page 53 and was surprised to come in contact with real abrasives.

"After reading about the Usership Idea of the Month contests, and being short of an abrasive pad, I thought here was a good way to avail myself of a pencil sharpener. I removed the page and stapled it to the corner of my drafting board.

". . . I would like to compliment you on the Usership contest. I think it has merit and competitive application in product sales and magazine output."

Another Sharp Use . . .

. . . was found by Flora M. Perry, Huron, Ohio. Said she: "I'm a laboratory technician and one of your advertisements helped me. It was like a living commercial.

"Samples from furnaces had to be machined before being analyzed. The tools used for machining were dull, with metal piled up on the edges. The man who sharpens them had gone home.

"Remembering the Norton advertisement, I quickly tore out the abrasive illustrations and touched up the tools, giving them sharp edges. Presto—back in business."

You Can Win $1000 This Month

There are five issues of STEEL this month—and one could help you win $1000 in our Usership Idea of the Month Contest.

Tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month—October, 1960) to help you accomplish an important personal or company objective. Be as specific as you can. If, in the opinion of the judges, yours is the best idea submitted — **you will win $500.**

There's more . . . You will win an additional $500 if you furnish written proof that you accomplished your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month Award.

You may enter as many times as you wish. Please identify your letters as Usership entries. They will be judged by a committee of STEEL's editors. All letters become STEEL's property.

Send entries to me, Ed Service, Servicenter, STEEL, 1213 W. Third St., Cleveland 13, Ohio. Deadline for this month's contest is Dec. 1.

The September contest closes Nov. 1.

The Last Word on Usa

We're grateful to H. E. Markley, executive vice president, Timken Roller Bearing Co., Canton, Ohio, for clearing up an international intrigue that started on these pages in the Aug. 1 issue.

"I have noticed the comments in the Servicenter . . . on the bearings made in Japan and stamped with the trademark 'Timke.' I also noted the comments by Meyer Bernstein in Sept. 19 issue, saying, in effect, that this is not true. Perhaps I can clarify the situation.

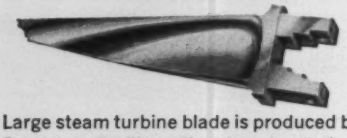
"It is fair to say that this practice is not now being carried on in Japan. Because of the similarity of the trademark to our own, we were much concerned and instrumental in getting the practice stopped. Checking our files, we find that on Nov. 28, 1931, bearings were received by us with the name 'Timke' on them. They were manufactured by Nakayama Seisakusho, No. 303, Koyama, Ebaragun, Tokyo-Fu.

"I also note in our file a letter, dated Apr. 2, 1932, in which our Japanese attorney advised

TIME SAVINGS!

Here's how Ex-Cell-O's Numera-Trol system of tape-controlled precision machine tools cuts costs for three modern manufacturers . . .

Precision Contouring Machine, controllable to .000025", saves 112 hours lead time, 54 hours grinding time in production of this templet.



Large steam turbine blade is produced by Precision Profiling Machine. Lead time saved, 120 hours; machining time saved, 78 hours.

Fuel control cam, produced by Precision Cam-Milling Machine, goes from performance curve to machined part in just 47.5 hours. Former method took 230 hours.

How many hours can Ex-Cell-O Numera-Trol save for you? For a prompt answer, see your Ex-Cell-O Representative, or call or write direct—and be sure to ask for your free copy of "A Guidebook to Numerically Controlled Machine Tools."

NUMERA-TROL (XLO)

PRODUCED BY

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN 60-58

EX-CELL-O FOR PRECISION

Servicenter

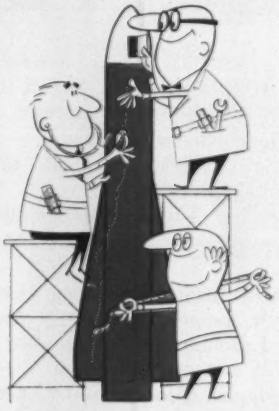
that he had issued a warning to Nakayama Seisakusho, as well as to another firm known as Takama Shoten of 112 Hiro-o-cho 1-chrome, Azabu-ku, Tokyo, for using a trademark which infringed on our registered trademark in Japan.

"After notice by our Japanese attorney, the infringing use was stopped. However, after giving up 'Timke,' this same Nakayama Seisakusho adopted the trademarks 'Timkfn' and 'Timk.' Here again a notice of infringement was given through legal channels and was sufficient to bring about the discontinuance of the infringement. This latter incident appears to have been sometime about September, 1936, for on Oct. 20, 1936, we received bearings with the trademark 'Timkfn' on them.

"These bearings were kept in our museum here for a number of years, but several years ago . . . they apparently were thrown out, and we do not have them as evidence today.

"On the question of Usa (a city in Japan), it is clear in the minds of some of our people . . . that 'Made in USA' was on the bearings. However, our files do not make mention of this particular practice."

Growth in the Space Age



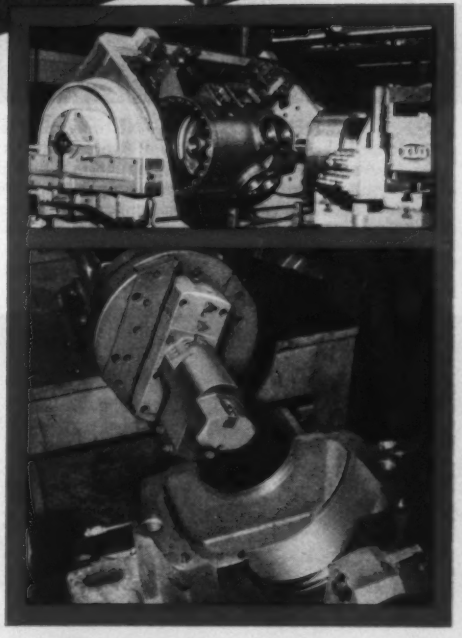
There's a lot of talk these days about research and development, why it's necessary, how to organize for it, and how it pays off. Cook Electric Co., Chicago, offers profitable reasons and examples on all scores.

In 1939, the company mostly made distribution and protection equipment for telephone systems, and its sales volume stood at $350,000. Today, the tally reads a robust $42 million, with 25 per cent of the amount brought in via R&D contracts.

The phenomenal growth started in World War II when Cook took on a tricky job of welding Monel bellows out of thin sheet stock. The successful project spearheaded a list of contracts in missiles, rockets, aircraft, instruments, controls, communications equipment, among others. Prominent on the list: Development of the nose cone recovery system for Jupiter missiles and design plus installation of nationwide radio and telephone systems in Nepal and Liberia.

In researching the company, Chicago Resident Editor Austin Brant found accents that fostered Cook's continued growth. Read about them in next week's issue.

STANDARD EX-CELL-Os
for large, heavy parts!



- Accuracy, heavy cuts and good finishes on large parts are the high-production features of Ex-Cell-O Models 771 and 772 (double-end) Horizontal Precision Boring Machines
- These precision-built workhorses have husky nickel cast-iron bases with wide-spaced ways, extra-strong tables to handle the heaviest fixtures and workpieces, and infinitely adjustable hydraulic feeds in both directions for maximum cycling efficiency.
- A range of standard spindles, bridges and drive equipment lets you custom-equip Models 771 and 772 to suit your particular precision boring, turning, facing, grooving and chamfering operations.

Contact your Ex-Cell-O Representative or write direct for details.

Typical of parts handled by Models 771 and 772 are large air conditioning compressor housing castings (main illustration and close-up above), and cast-iron pillow block bearing support housings (bottom photo). Machine takes 5/8" cut as it roughs, finish-bores, and generates interior form of support housing in a single cycle.

60-25

EX-CELL-O FOR PRECISION

PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • TORQUE ACTUATORS • CONTOUR PROJECTORS • GAGES AND GAGING EQUIPMENT • GRANITE SURFACE PLATES • COMPUTER PRODUCTS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • ATOMIC ENERGY EQUIPMENT • DAIRY AND OTHER PACKAGING EQUIPMENT

Machinery Division

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DETROIT 32, MICHIGAN

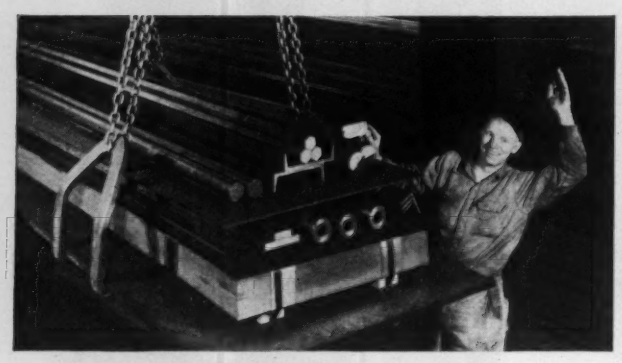
Unbiased recommendations...

STEEL...ALUMINUM...

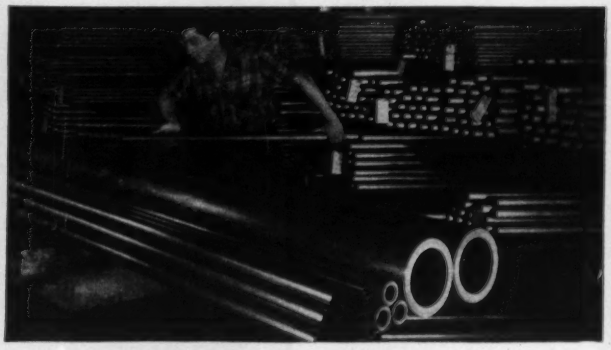
Because Ryerson is the nation's largest supplier of steel in all types and sizes—*plus* aluminum, plastics and machinery—you're assured of *unbiased* recommendations on materials and metal-fabricating machines to do your job best at lowest cost.

And along with the size and diversification of stocks comes this unsurpassed service: certified quality, on-time delivery, top technical help, 117 years of integrity.

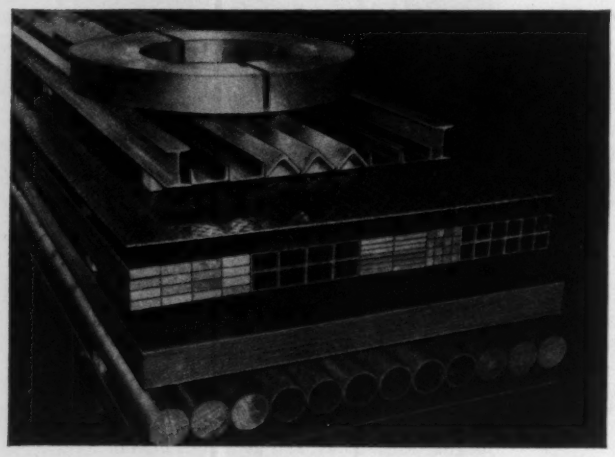
Put it all together and you have Metalogics—the Ryerson science of giving optimum value for every purchasing dollar. Ask your Ryerson representative for details.



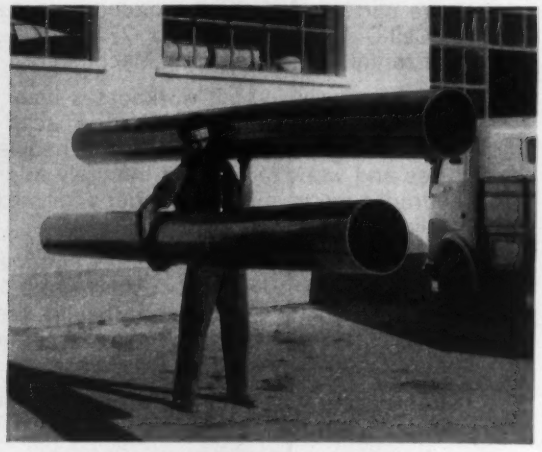
CARBON STEEL—No one even comes close to the size and diversity of Ryerson stocks of hot rolled carbon steel. All bars, structurals and plates are of known analysis or physical properties. Widely acclaimed accuracy of Ryerson sawing, shearing and flame-cutting is assured by published tolerances that are the most exacting in the industry.



TUBING AND COLD FINISHED BARS—Here again, Ryerson stocks are by far the nation's largest—including seamless and welded mechanical tubing; hydraulic cylinder and fluid line tubing; structural tubing; new Ledloy® 170 tubing, etc. And in cold finished bars—shafting, machinery steel, accuracy stock and screw stock, including fast-machining Ledloy 375 & 300.



ALUMINUM—Nation-wide Ryerson service on Reynolds aluminum includes all mill products—a full range of alloys, tempers, gauges and sizes. Stocks include: flat and coiled sheet; plate; tubing and pipe; wire, rod and bar; structural and extruded shapes; commercial building products and related items.

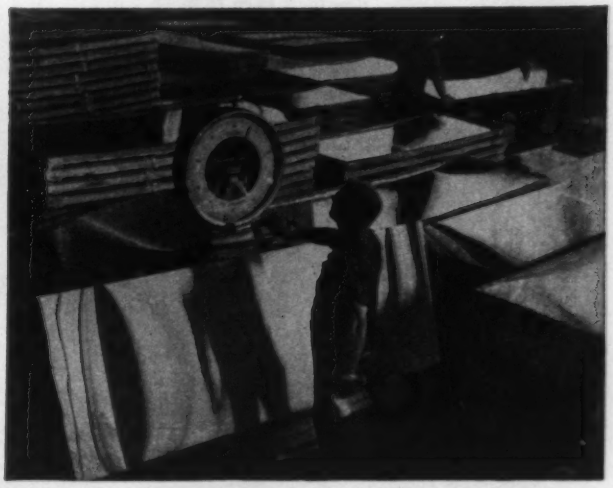


INDUSTRIAL PLASTICS—Call Ryerson for Ryertex-Omicron PVC pipe and tubing, sheet and rod: plastic that conquers more than 281 corrosive liquids and gases—will not weather, rot or age. Also for rigid Kralastic and flexible polyethylene pipe, and Ryertex® laminated phenolic resin plastics in sheets, rods and tubes... special shapes molded to your specs.

unequaled service on

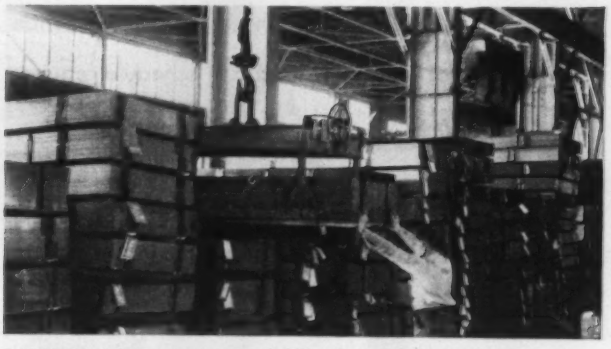
PLASTICS...MACHINERY

ALLOY STEEL—Ryerson developed and perfected a plan to assure risk-proof alloys through an 8-Step Certified Quality Program—and leads the industry in size and diversification of stocks, including case-hardening, direct-hardening and heat-treated alloys; leaded alloys, including Rycut® steels (fastest-machining in their carbon ranges); aircraft quality alloys, etc.



STAINLESS STEEL—2351 sizes, shapes, types and finishes of stainless in Ryerson stocks. All certified to meet ASTM, SAE, Military, DuPont or G.E. specifications—assuring close control over chemical composition and mechanical properties. Call us for all your requirements on stainless sheets, plates, bars, pipe and fittings and tubing, heads and machine-cut rings and discs. Cutting facilities include latest Heliarc equipment.

METALWORKING MACHINERY—More than 3800 types and models of machinery and tools produced by nearly 100 of the nation's leading manufacturers are available through the Ryerson Machinery Division. The broadest line available from a single source includes equipment for bending, braking, forming, hoisting, drilling, pressing, punching, rolling, sawing, shearing, threading, welding. Also, material handling equipment.



SHEET AND STRIP STEEL—More than 20 kinds. Hot rolled, cold rolled and pickled and oiled—tight-coated galvanized and galvannealed—Ryex® expanded metal, perforated sheets, etc. Latest shears, slitters, and cut-to-length lines enable us to give fast delivery on every requirement.

METALOGICS
RYERSON PLUS VALUES

STEEL • ALUMINUM • PLASTICS • METALWORKING MACHINERY

RYERSON STEEL®

Joseph T. Ryerson & Son, Inc., Member of the INLAND® Steel Family

SERVICE CENTER PLANTS: BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DETROIT • HOUSTON • INDIANAPOLIS
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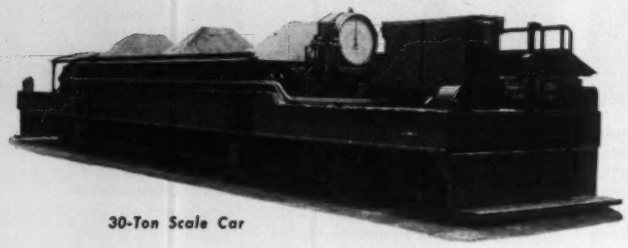
Which Counts Most?



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Cost . . . performance . . . safety features? Usually it's all these, plus the solution of individual load and schedule requirements.

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ATLAS CAR & MFG. COMPANY

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CLEVELAND 10, OHIO

CALENDAR
OF MEETINGS

Oct. 24-26, Truck Body & Equipment Association Inc.: Annual convention and exhibit, Hotel Sherman, Chicago. Association's address: 1616 K St. N.W., Washington 6, D. C. Executive manager: Arthur H. Nuesse.

Oct. 25-27, Society of Automotive Engineers Inc.: National transportation meeting, Hotel Leamington, Minneapolis. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Oct. 30-Nov. 3, National Fluid Power Association: Semiannual meeting, Edgewater Beach Hotel, Chicago. Association's address: 1618 Orrington Ave., Evanston, Ill. Executive vice president: Barrett Rogers.

Oct. 31-Nov. 1, Society of Automotive Engineers Inc.: National diesel engine meeting, Sheraton-Cleveland Hotel, Cleveland. Society's address: 485 Lexington Ave., New York 17, N, Y. Secretary: John A. C. Warner.

Oct. 31-Nov. 2, Packaging Institute: Annual meeting, Statler-Hilton Hotel, New York. Institute's address: 342 Madison Ave., New York 17, N. Y. Executive director: Charles A. Feld.

Oct. 31-Nov. 3, American Institute of Steel Construction: Annual convention, Greenbrier Hotel, White Sulphur Springs, W. Va. Institute's address: 101 Park Ave., New York 17, N. Y. Executive vice president: L. Abbett Post.

Nov. 1-4, National Association of Aluminum Distributors: Annual convention, Boca Raton Hotel & Club, Boca Raton, Fla. Association's address: 1900 Arch St., Philadelphia 3, Pa. Secretary: R. Bruce Wall.

Nov. 2-4, Society for Experimental Stress Analysis: Fall meeting, Claremont Hotel, Berkeley, Calif. Society's address: P. O. Box 168, Cambridge 39, Mass. Secretary-treasurer: W. M. Murray.

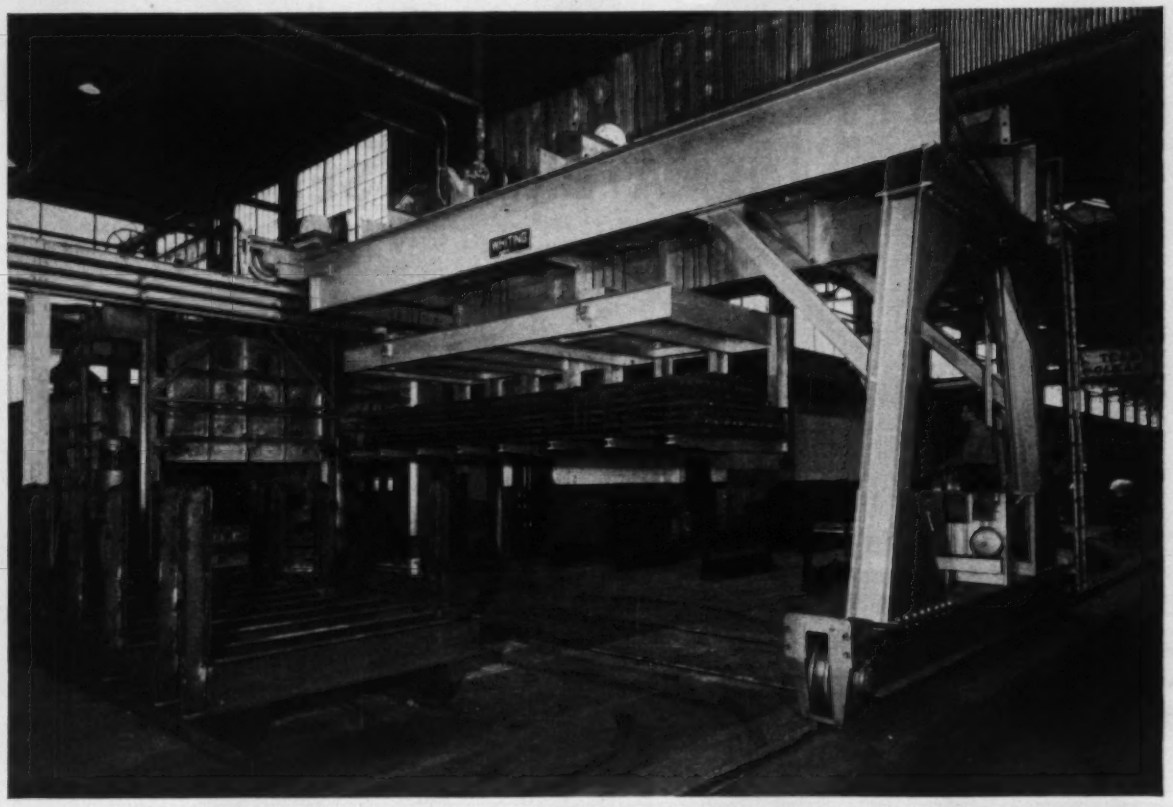
Nov. 3, American Gas Association: Metal Treating Symposium, New Englander Motor Hotel, Westport, Conn. Association's address: 420 Lexington Ave., New York 17, N. Y. Managing director: C. S. Stackpole.

Nov. 3-4, Society of Automotive Engineers Inc.: National fuels and lubricants meeting, Mayo Hotel, Tulsa, Okla. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Nov. 13-15, National Association of Secondary Material Industries Inc.: Joint Pacific Coast conference of NASMI and the Institute of Scrap Iron & Steel, Beverly Hilton Hotel, Los Angeles. Association's address: 271 Madison Ave., New York 16, N. Y.

Nov. 14-16, Steel Founders' Society of America: Technical and operating conference, Pick-Carter Hotel, Cleveland. Society's address: 606 Terminal Tower, Cleveland 13, Ohio. Executive vice president: F. Kermit Donaldson.

WE WORKED TOGETHER WITH BLISS & LAUGHLIN TO BOOST FURNACE CAPACITY 20%



The Whiting gantry crane **above** relieved a staggering bottleneck at Bliss & Laughlin's busy mill in Harvey, Illinois. Four heat treating furnaces are now speedily loaded and unloaded in contrast to a system that was arduous, time-consuming and costly. The new gantry has stepped up furnace capacity over 20% and cut maintenance on furnaces and loading cars. B.&L.'s service to customers has greatly improved.

A simple solution? Yes. But B.&L. engineers had been nettled for years by the heat treating log jam. They considered many possibilities including lift trucks.

There is a kind of "togetherness" that operates between Whiting and our customers and the solution Bliss & Laughlin found is an example of how it works. We may be able to help you too—and what we recommend, we back up by product performance. Let's get together.

Want details? Write for brochure No. 93 Whiting Corporation, 15643 Lathrop Ave., Harvey, Illinois

See our catalog in Sweets

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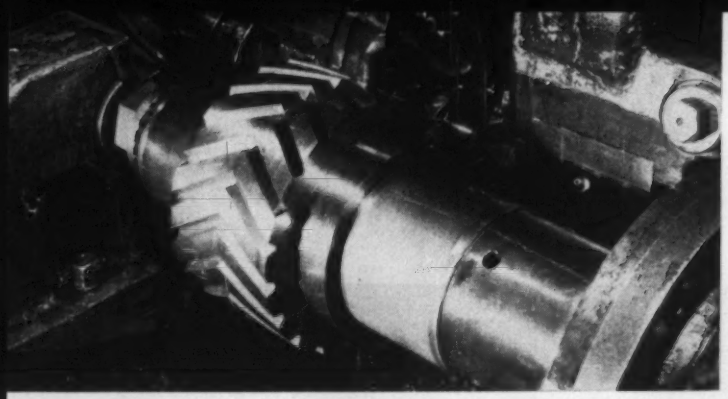

FOR ADDED MACHINABILITY, consider Republic Cold Drawn Leaded Alloy Steels. Leading producers of gears use Republic Leaded Alloy Steel in the production of heavy-duty herringbone gears. The addition of lead increases machinability as much as 25%. Heat treating assures adequate hardness and toughness. These cost-reducing alloys are available in almost every standard analysis and many specials. Mail the coupon for information.

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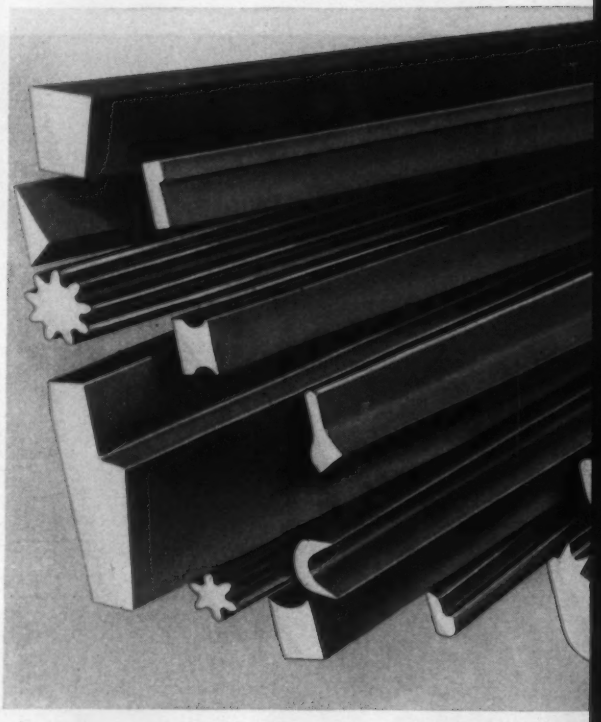

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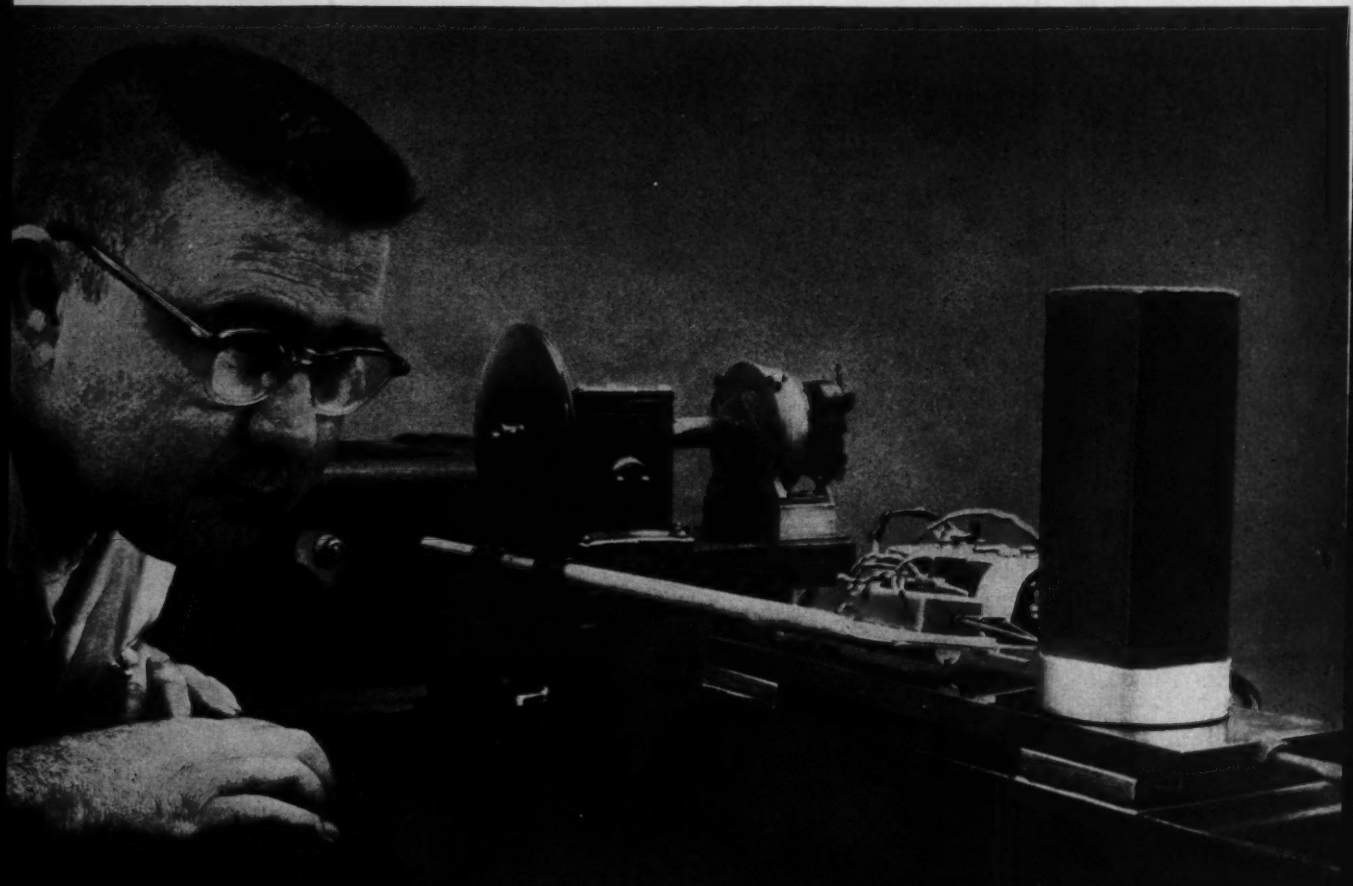
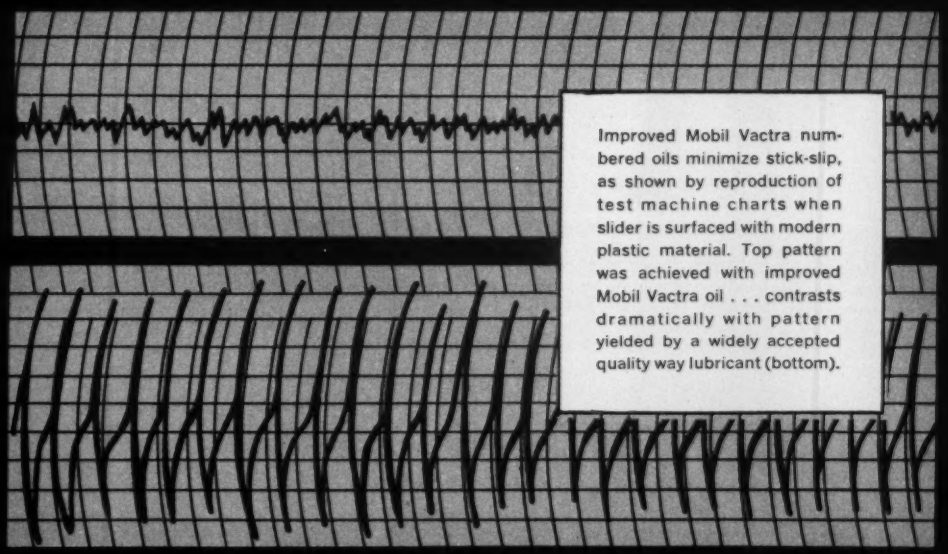


Stick-slip tester developed by Mobil's research laboratories closely simulates operating conditions of today's machine tools . . . records stick-slip electronically as weighted slider is pulled across lubricated cast iron bed.



Improved Mobil Vactra numbered oils minimize stick-slip, as shown by reproduction of test machine charts when slider is surfaced with modern plastic material. Top pattern was achieved with improved Mobil Vactra oil . . . contrasts dramatically with pattern yielded by a widely accepted quality way lubricant (bottom).

QUALITIES REQUIRED BY TODAY'S MACHINE TOOLS!

IMPROVED MOBIL VACTRA Nos. 1·2·3·4

Excellent for all way systems, all way surfaces, all operating conditions!

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Now you can get all six—with Improved Mobil Vactra® oils Nos. 1-4, inclusive!

These improved Mobil Vactra oils provide these advantages: • Minimum stick-slip on all types of ways—steel, cast iron or plastic. • Control of table "float" through correct viscosity—without risk of film failure and wear. • Protection against way scoring through controlled EP qualities. • Prevention of lubricant filter clogging. • Protection against rust and corrosion. • Stability under all normal operating conditions.

Improved Mobil Vactra oils Nos. 1-4 offer these benefits:

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Available in four viscosities, Improved Mobil Vactra numbered oils permit the selection of a grade exactly suited to any critical operating condition. For complete details, call your Mobil Representative or use the coupon below.

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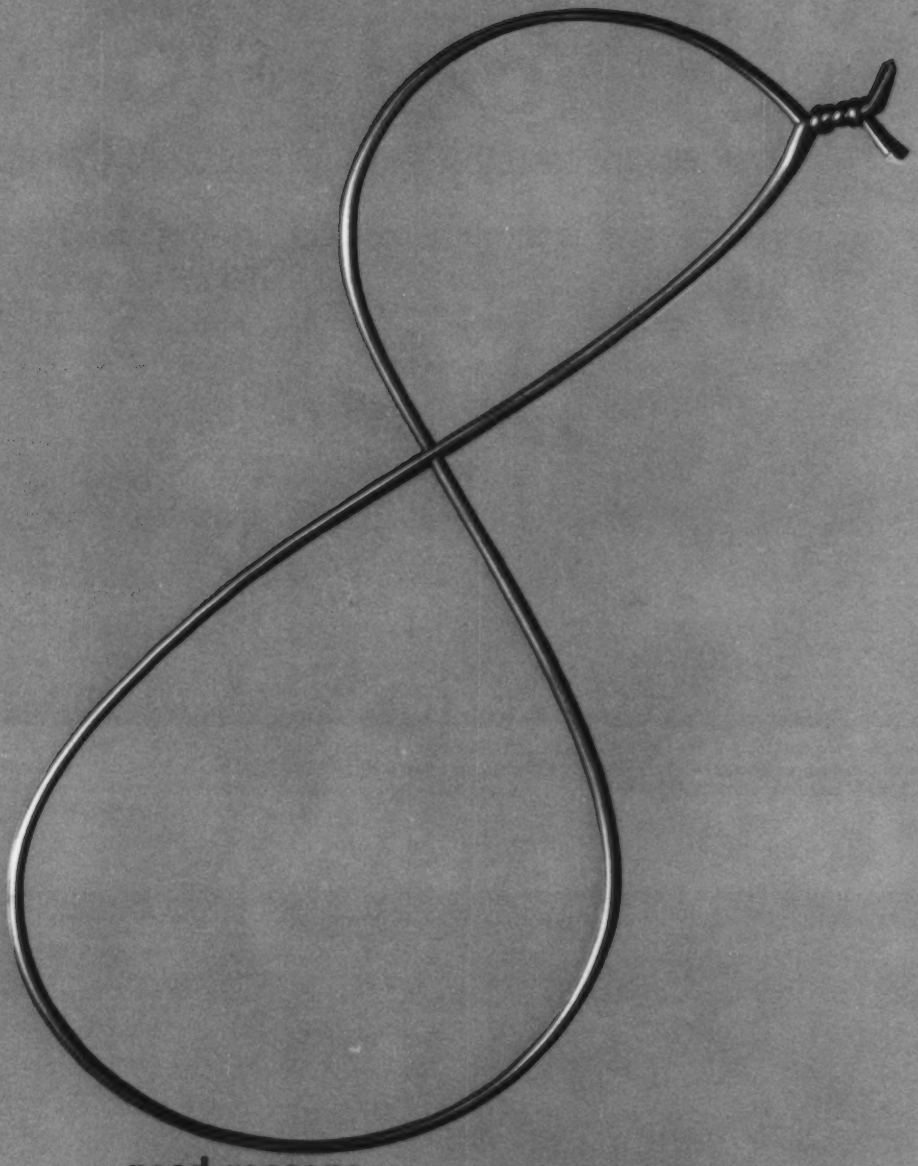
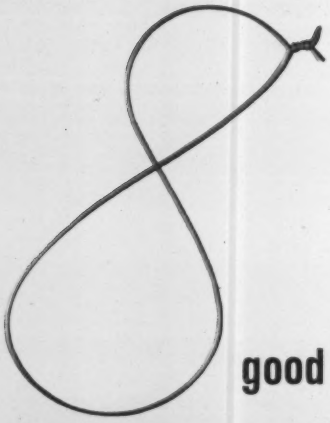


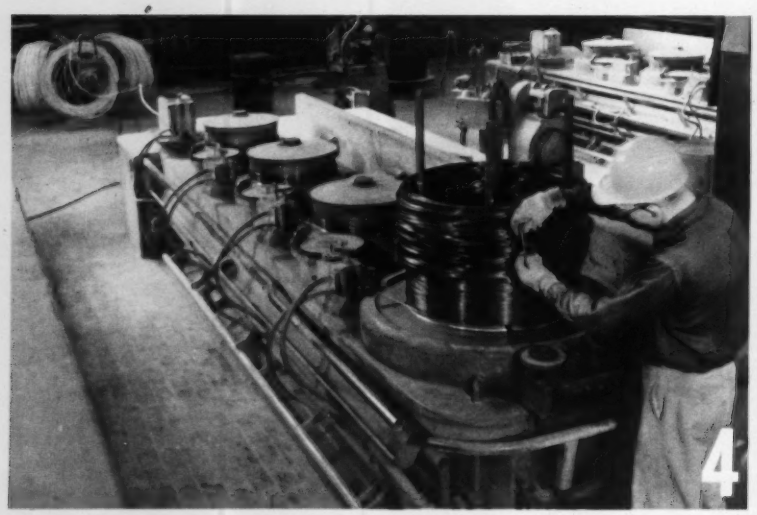
good reasons
why it pays to specify
American Steel & Wire
for all of your
stainless steel wire needs



good reasons why it pays to specify American Steel

By using modern welding techniques, we can turn out continuous coil weights as heavy as 500 pounds to suit your particular needs. Heavier coil weights reduce down time on your machines, speed handling of material.

The latest in controlled annealing methods enable us to produce uniform properties in stainless wire that assure consistent performance on your equipment and in your product.



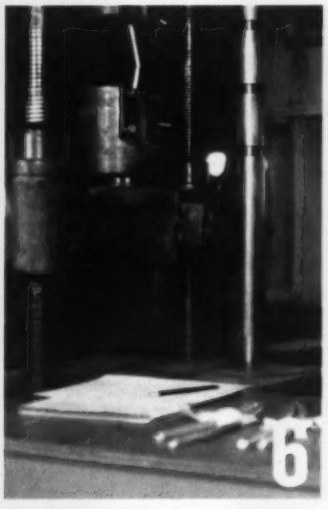
To insure the gage of your stainless is consistent from end to end, it's checked constantly during the continuous drawing process. ASW's wide range of modern, precision drawing machines can turn out everything you need in type, size and finish.

After drawing, the wire is again inspected to make certain that the gage and finish are exactly as specified.

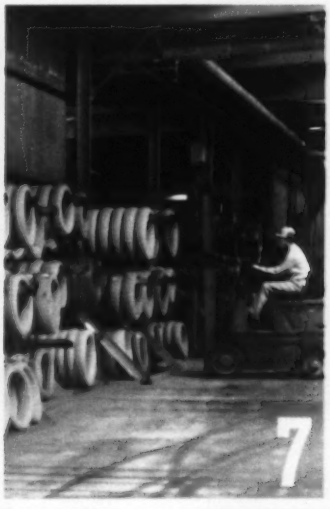
This mark tells you a product is made of modern, dependable Steel.

& Wire for all of your stainless steel wire needs

Up-to-date salt and acid bath techniques and equipment guarantee the smooth, clean wire surface so important to the finished quality of your product. After cleaning, coatings such as this electrolytic copper coating are often applied to make your job of fabrication easier.



During processing and at finished size, our stainless wire is tested for tensile strength and other properties to make sure it meets specifications. Such tight control insures quality.



To insure supply and fast delivery, we stock 300 to 400 tons of cold heading stainless wire in addition to a heavy tonnage of other stainless steel wire items at all times.

8 **Our stainless steel wire service is second to none.** In addition to our regular salesmen, we have special Stainless Steel representatives in your area who have both engineering and mill backgrounds. They know metals, they know production. Their assistance can be invaluable to you in solving the really tough ones. Call your nearest ASW Sales Office today. If you like, we'll have a man out to see you at your convenience. Or if you prefer, write American Steel & Wire, Dept. 0383, 614 Superior Avenue, N.W., Cleveland 13, Ohio.

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This is another example of the ability of Amsler Morton engineers to translate a specific and unusual problem into a completely satisfactory installation.

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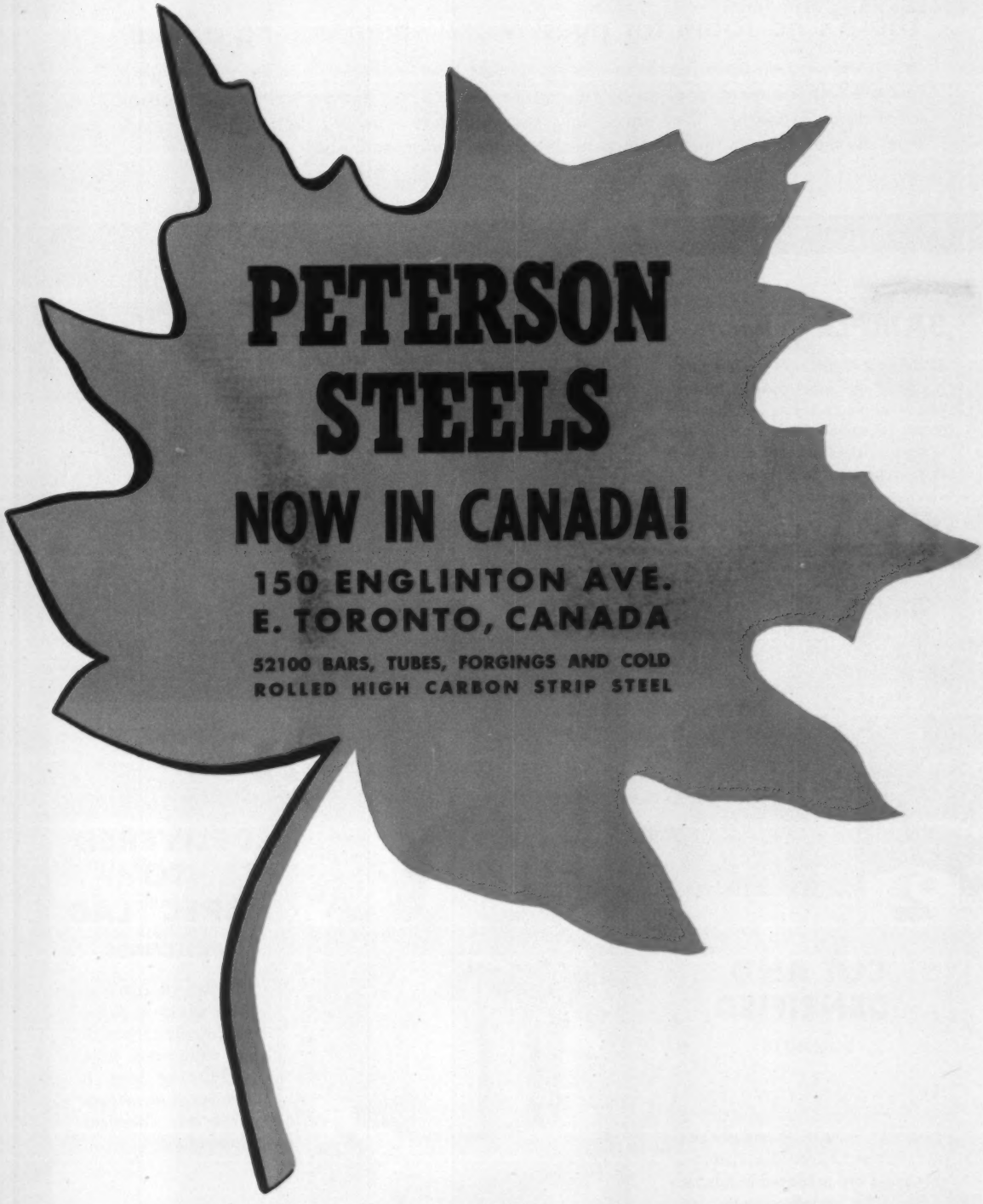
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AT THIS LARGE STEEL PLANT...

There's no room for guess work when making a heat!

When working an open hearth or electric furnace heat, melters at a major steel corporation are told the exact analysis of the bath in less than ten minutes by the spectroscopic laboratory. To see how these amazingly fast results are obtained, let's follow a sample from the melt floor to the spectroscopic laboratory for an analysis.

1

SAMPLE—1 MINUTE

At the time a spoon of molten metal is taken, the spectroscopic laboratory is notified sample is on the way. Metal is poured in a specially designed quick-chill mold and is sent to the chemical laboratory.

2

CUT AND IDENTIFIED

1 MINUTE

Sample is cut quickly on an abrasive cut-off wheel and is labeled with an identification tape. Previously samples were etched for identification—now tapes are prepared in advance to speed the overall operation.

3

DELIVERED TO "SPEC" LAB

40 SECONDS

The sample comes to the spectroscopic laboratory through a pneumatic tube 1,980 feet long. It arrives in 40 seconds from the chemical laboratory.

4

POLISHED

30 SECONDS

Sample is polished on a horizontal disc grinder utilizing a stainless steel platen. The design of this polisher assures a perfectly flat surface on every sample.

ANALYZED AND REPORTED

5

4 MINUTES

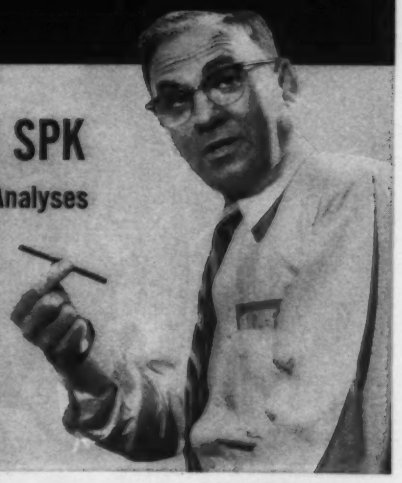
The sample is run in duplicate on a direct reader. The analysis which is automatically recorded is reported by "teletalk" to the melter or first helper on the furnace floor.

RESULTS obtained quickly and economically from the spectroscopic laboratory — permit this firm to make steels to very exacting specifications, thereby insuring a better and more uniform end product.

"NATIONAL" GRAPHITE RODS GRADE SPK

Help Contribute to the Confidence Limits of Spectrographic Analyses

Grade SPK graphite rods, a newly introduced product, are more uniform within the rod, from rod to rod and from box to box. This feature is reflected in improved reproducibility, precision and accuracy, especially where high-alloy constituents are involved.



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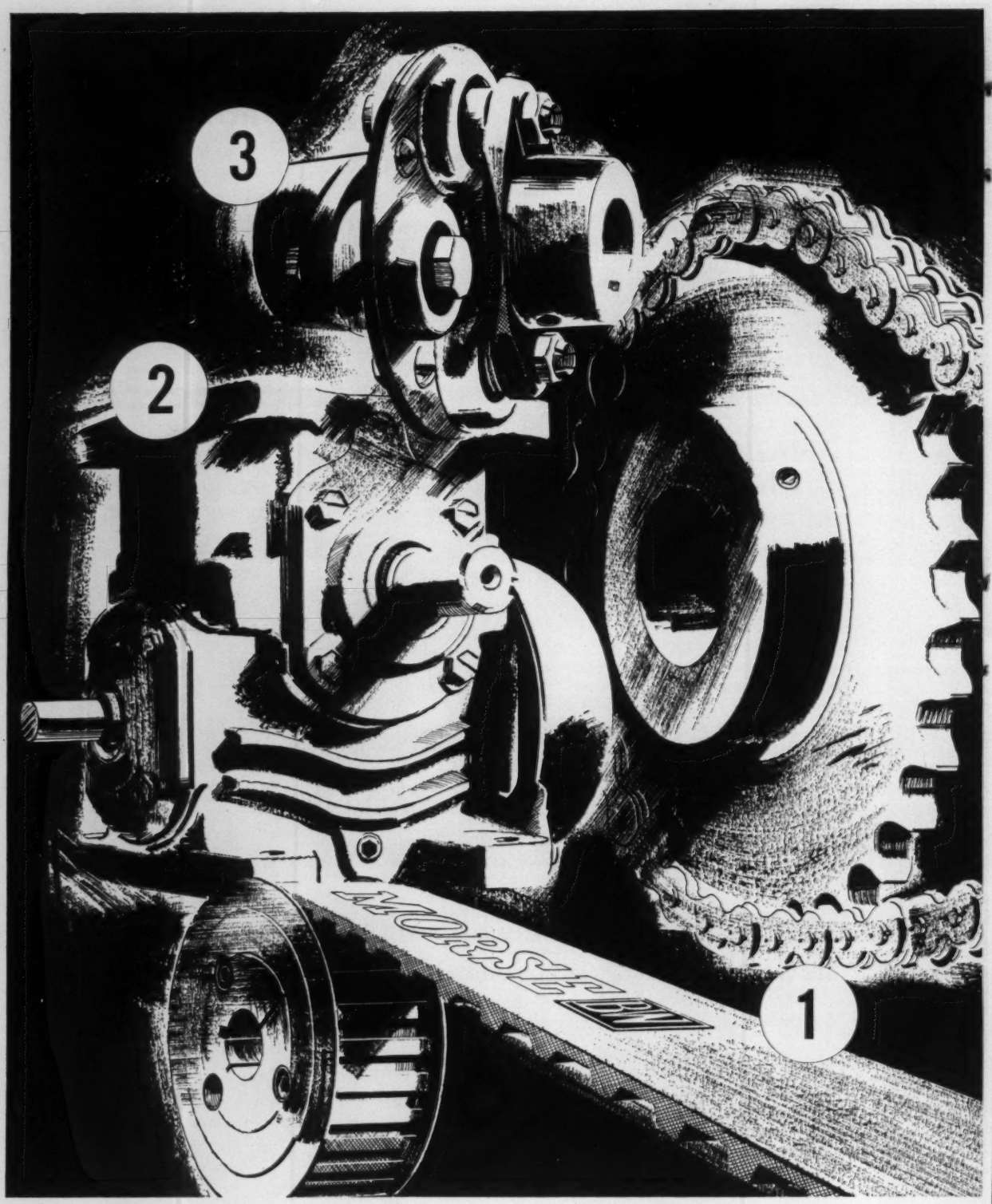

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2 SPEED REDUCERS

Eberhardt-Denver "RW" PoweRgear® Reducers, Gearmotors, Worm Gear Reducers, Conveyor Drives, Mitre Boxes, Helical Reducers.

3 COUPLINGS

Flexible Roller and Silent Chain Couplings; Morflex Couplings, single and double; Morflex Radial and Marine Couplings.

4 CLUTCHES

Morse Cam (Over-Running, Back Stopping, Indexing), Pullmore, Over-Center, Torque Limiter and Centrifugal Styles afford flexible control of power.

Only Morse offers all 4 . . . only Morse can accept

Full responsibility for your industrial power drive

Drives, speed reducers, couplings and clutches . . . designed better, built better, distributed better and backed by the only company that takes on the whole job of satisfying you

If you have a production process that requires transmission of mechanical power, it just makes good sense to deal with a company that can take on the *whole* job—furnish *all* the components—guarantee your satisfaction with the *complete* power train.

And *only* Morse can do it!

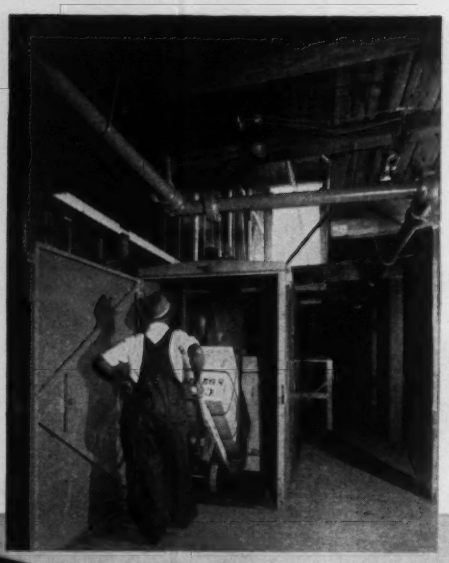
Drives, speed reducers, couplings and clutches: Morse designs them better to work together . . . builds them better to high quality standards for longer life, in a wide variety of sizes and capacities ideally suited to any job. Moreover, Morse distributes them better for broader, faster customer availability.

Morse—the No. 1 supplier of automotive timing chains—has, through continuous expansion, evolved a complete line of exclusive power-transmission products. Among them, the well-known Morflex couplings . . . H-E roller chain . . . Hy-Vo® drives . . . Rockford Clutches, Eberhardt-Denver speed reducers and full line of components for the broad industrial fields.

Whether your next project calls for a single coupling or a complete power train, your Morse distributor is the man who can help you most. He's always nearby, listed in the Yellow Pages. Or, if you wish, write direct: Morse Chain Company, Dept. 2-100, Ithaca, New York. Export Sales: Borg-Warner International, Chicago 3, Illinois. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ontario.

MORSE BW

A BORG-WARNER INDUSTRY



Uses Skyway For Handling Materials AUTOMATICALLY

Completely Pays for Itself Every Three Years

Loading a van on the second floor of a building. This same van also may be lowered to the floor below for loading. Although the building at this end of the system is quite old, the Cleveland Tramrail equipment was easily installed.

For years this vast roof area did nothing more than provide protection from the weather. Now it is being used profitably for materials handling. Illustrated is the van emerging from the penthouse.

BY erecting a Cleveland Tramrail materials handling system over the roofs of its buildings, a large plant is able to transport materials between departments located in widely separated buildings at very low cost.

Because the system operates automatically, the Tramrail carrier travels back and forth without any operator. The carrier van is loaded or unloaded at convenient areas inside the buildings. Pressing a button sends it on its way. It rises vertically to a penthouse on the roof. Then it makes its run over the track system to the penthouse at the other end. Here it lowers to the floor inside for loading or unloading.

The system eliminates considerable floor traffic and saves space required for wide aisleways. It operates at any time, day or night. Inclement weather does not hinder it. The system requires only a fraction of the maintenance necessary for floor handling equipment. It does not wear or damage floors. It is a big aid to safety. In addition to these important benefits, the Cleveland Tramrail system makes tremendous time savings — enough to completely pay for the entire installation every three years.

Cleveland Tramrail has had wide experience in automatic dispatch materials handling systems of many types. Our engineers will welcome an opportunity to work with you.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

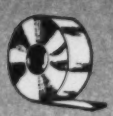
CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7819 E. 290 ST. • WICKLIFFE, OHIO

NICKELOID IS EVERYWHERE

IN THE LIVING ROOM

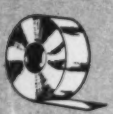
IN THE KITCHEN

ALL AROUND THE HOUSE



These eye-catching products use functionally a basic Nickeloid Metal. The finish of Chromium, Nickel, Brass or Copper is electroplated to a base metal, usually Steel (but often Zinc, Brass or Copper).

Mostly, Nickeloid Metals are supplied in continuous coils in widths up to 24" for modern, low cost fabrication. They're also available in sheets and strips. Optional: bright or satin finishes, plating one or both sides, a galaxy of stunning patterns and crimps.



Quality plating produces metals so durable they can be fabricated, even quite severely drawn or bent. Rejects minimized. For severe stamping, we offer Mar-Not protective coating that is easily peeled off after its job is done.

Yes, wherever you go or whatever you do, there is an abundance of useful and prized products on which a Nickeloid Metal gleams, front and center, in full spotlight. Their use at once captures a smart, modern beauty that is durable, easy to keep looking new, and chic. But here is beauty that is more than skin deep . . . Nickeloid Metals are versatile, extremely economical in manufacture . . . deep-down in quality all the way. They are the shopkeeper's delight, the manufacturer's friend, and the designer's inspiration. You can *do so much* with Nickeloid! It's more than a Metal . . . it's a *Method!* Write for free Introductory Kit, including metal samples. Or, phone one of our sales offices (located in most principal cities).

AMERICAN NICKELOID COMPANY · PERU 1, ILLINOIS

America's Pioneer Manufacturer of Pre-Finished Metals — Since 1898

NEW FROM FAIR STREET • HOME OF THE JIGMIL

new series

"Designated the model 'H,' our new Jigmil series provides greater range, is more rugged, easier to operate and more accurate."

"Available in spindle sizes ranging from 3" to 5", the new 3H, 4H and 5H machines greatly increase JIGMIL range for precision boring, milling, drilling and other operations. The new series introduces simplified controls, thermal control of main spindle bearings for increased accuracy . . . wider bed and table for added stability and working range . . . stainless steel way covers for positive protection . . . features that reach a new standard in JIGMIL accuracy, ruggedness and simplicity of operation. And like all JIGMILS, the 'H' series is available with the DeVlieg Diatrol direct dial dimensioning system or Tapac* —DeVlieg's own system of automatic tape control."

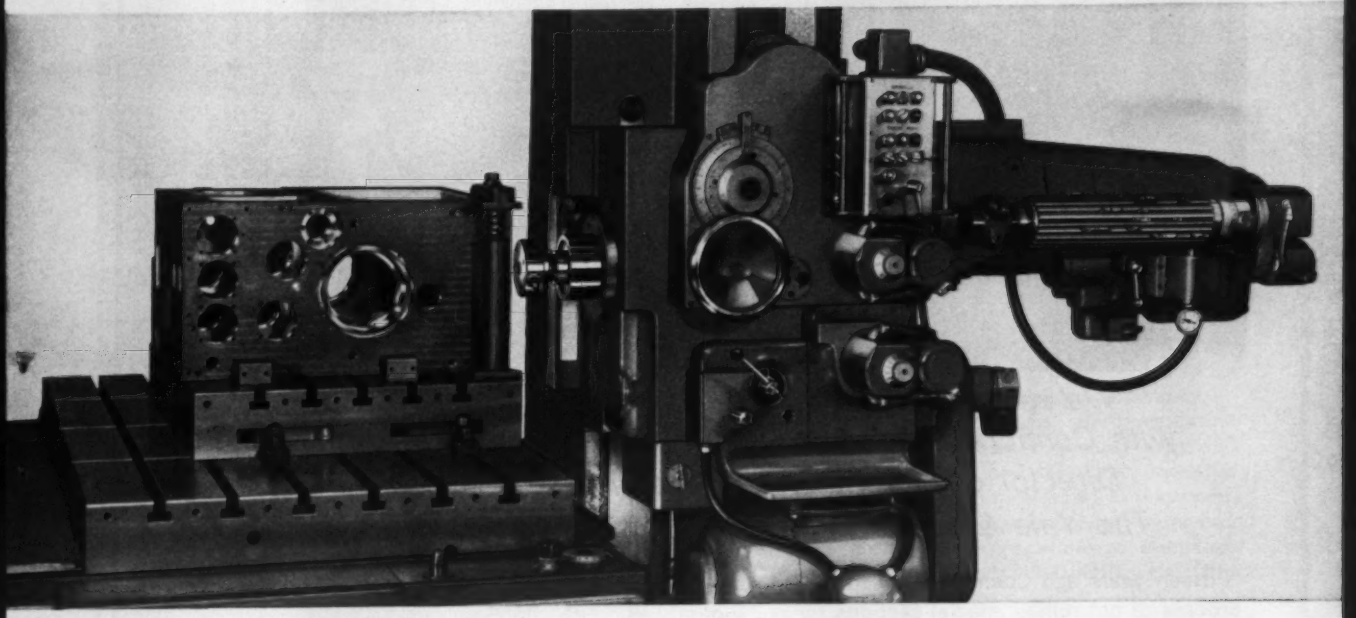
R. A. JERUE
Vice President in Charge of Engineering

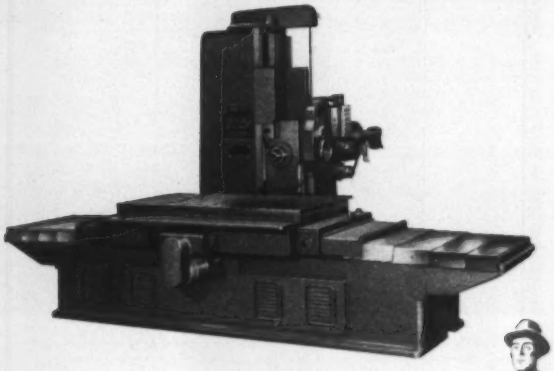
**Tape Automatic Positioning And Control*

DEVLIEG MACHINE COMPANY, FAIR STREET • ROYAL OAK, MICHIGAN

"H" Jigmils®

with Duplitrol • Diatrol • Tapac





Illustrated above is a Precision Spindle Head Casting being machined on a Model 3H-72 Spiramatic JIGMIL. Series 3H machines have 3" diameter spindle bar, 36" vertical travel and 48", 72" or 96" horizontal travel, designed for machining all types of production work and one-piece jobs in the medium size range.

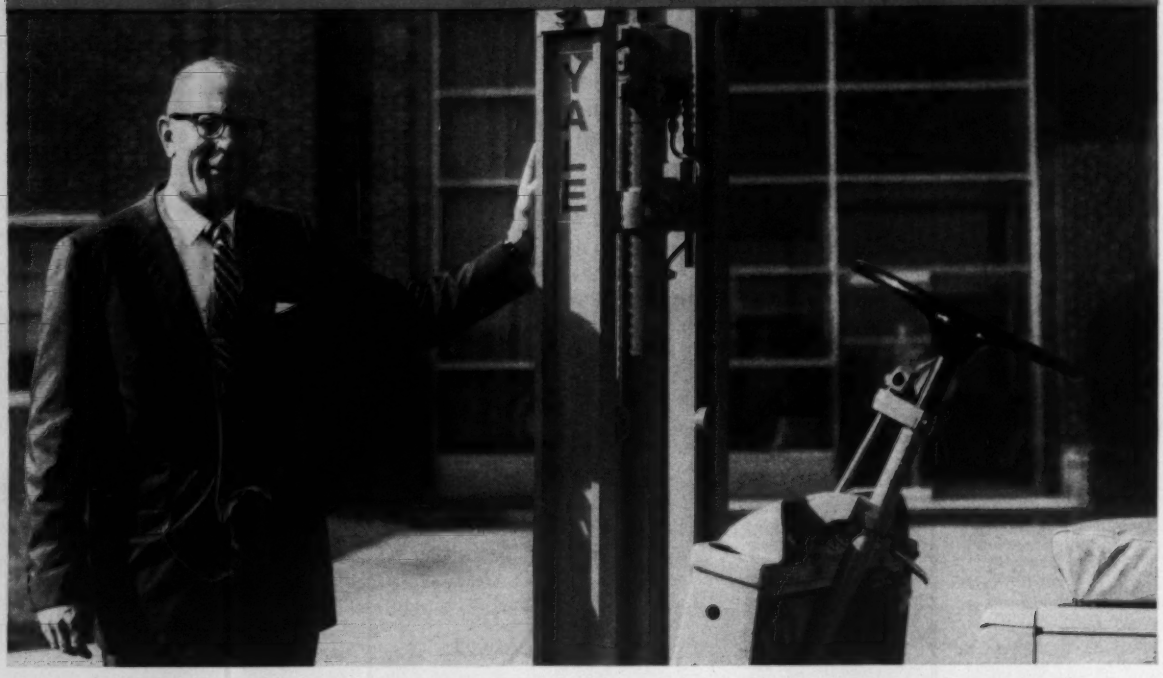
Rewarding revelations in automatic precision await your next visit to Fair Street

DeVlieg

SPIRAMATIC JIGMILS®

ACCURATE HOLES AND FLAT SURFACES IN PRECISE LOCATIONS

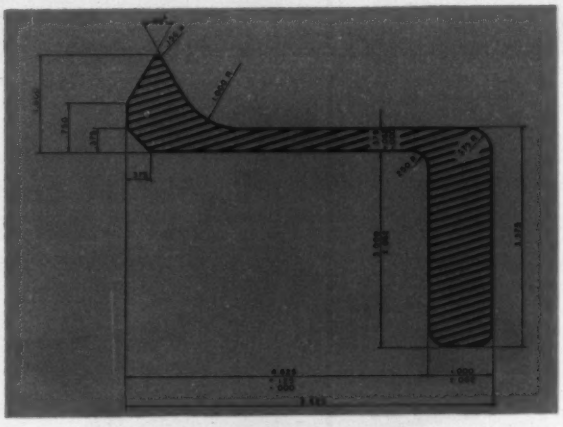
CONNORS special sections at Yale...



"We've had quality at cost savings ever since we pioneered with Connors Special Sections," says Mr. R. G. Ochsner, Director of Materials, Yale Materials Handling Division, The Yale & Towne Manufacturing Company.

"Fifteen years ago Connors came to us with a new process of hot rolling special sections for our industrial lift trucks masts," says Mr. Ochsner. "The Connors' Special Sections not only met our stringent specifications of strength and tolerances but provided a cost reduction over the cold drawn sections we had been buying.

"In addition, we found that the Connors Mill has the flexibility to handle the varied mast requirements our complete lift truck line demands. We could order the quantities we wanted thus avoiding excessively large inventories."



Yale's Design Engineers were concerned with possible bucking of the web in the channel of their largest truck mast assembly. Connors furnished two half sections to be continuously welded in the center. The knob furnished sufficient surface to insure a perfect weld and acted as a stiffening rib without the necessity of wasting steel where it is not needed.

Connors engineers can give you real help in the use of special sections.

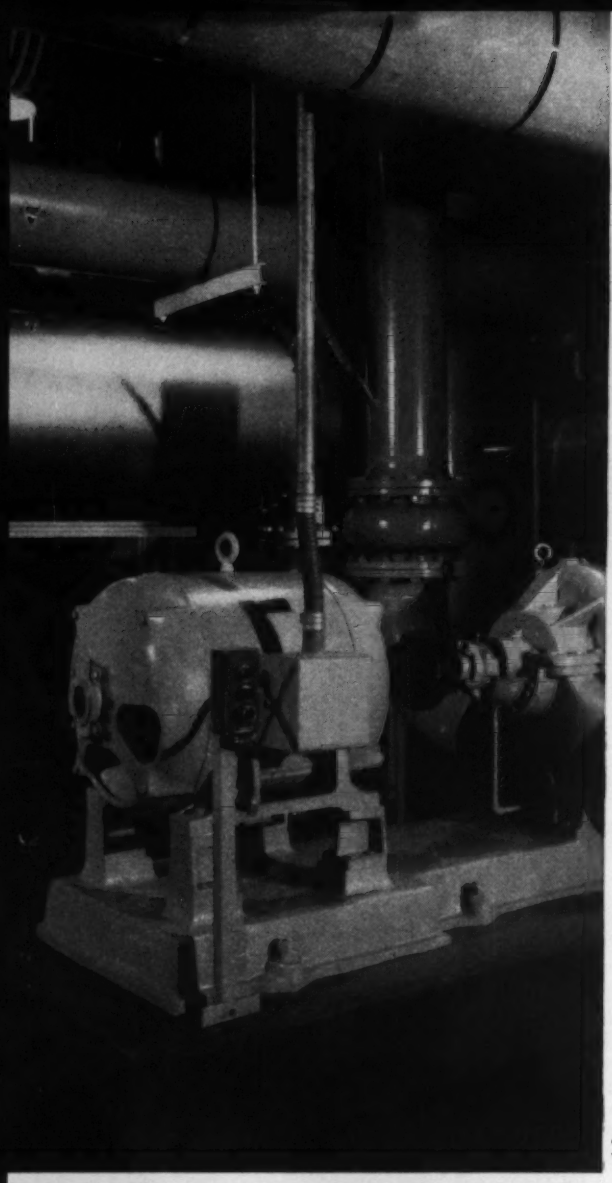
For illustrated brochure or consultation
Write or call Connors — Specialists in Special Sections

CONNORS STEEL DIVISION, P. O. BOX 118C
HUNTINGTON, W. VA. • PHONE JAckson 9-7171

CONNORS STEEL DIVISION **PORTER** ***H.K. PORTER COMPANY, INC.***

PORTER SERVES INDUSTRY with steel, rubber and friction products, asbestos textiles, high voltage electrical equipment, electrical wire and cable, wiring systems, motors, fans, blowers, specialty alloys, paints, refractories, tools, forgings and pipe fittings, roll formings and stampings, wire rope and strand.

1.



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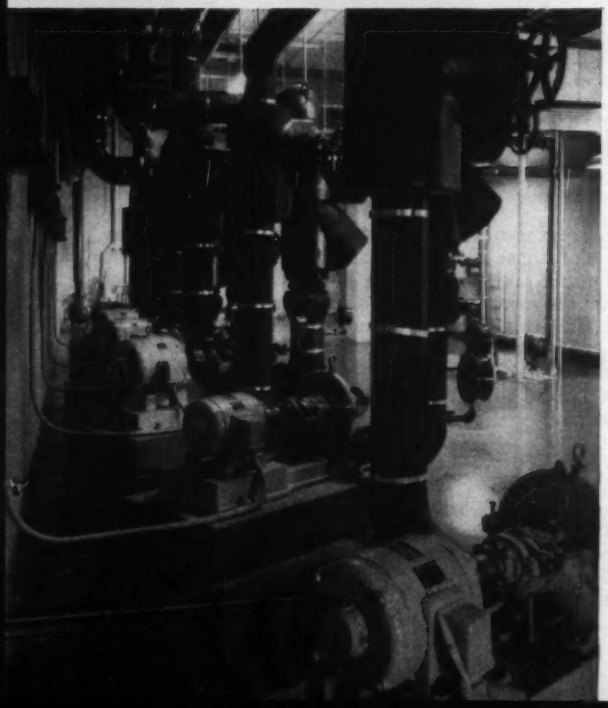


3.

CENTURY MOTORS ARE RIGHT FOR ANY PUMPING JOB

There is a service-proved Century motor for almost every industrial pump application—for centrifugal pumps, condensate pumps, chilled water pumps, reciprocating pumps and many more. Dependable Century motors have been performing outstanding pumping service for years in industrial plants, on farms, in power plants, in heating and air-conditioning units, and on hundreds of other demanding pumping applications.

Century motors have the precise speed regulation important in pumping. And they are exceptionally well protected against dirt, dust, and the severe moisture conditions frequently found in most pump applications.

Century standard squirrel cage motors are shown on this page on typical pump applications at Exchange Park, Dallas, Texas' completely air-conditioned "City within a City".

1. **Duplex condensate pumps driven by two Century squirrel-cage 5-horsepower motors. Pumps are in a pit where dust and dirt make motor ruggedness important.**

2. **Century 75-horsepower squirrel-cage motor drives a condensate water pump.**

3. **Six chilled water pumps driven by a series of two Century 5-horsepower motors, two 15-horsepower motors and two 20-horsepower motors are in the power plant of this large commercial development site.**

Century motors on these three pump applications have been operating for years without service or maintenance problems—proof of Century motor dependability.

Century Electric application engineers have years of experience in applying the right motor to your job. Contact your nearest Century Electric sales office or authorized distributor for more information about dependable Century motors.

CENTURY ELECTRIC COMPANY

St. Louis 3, Missouri *Offices and Stock Points in Principal Cities*

Century

60-11

Hand coiling of small spring orders is a skilled operation at The Yost Superior Co. in Springfield, Ohio. The company uses Johnson Music Spring Wire exclusively. Here, worker coils .012 wire into a compression spring with 16 coils having an O.D. of .196 inch. Small orders are filled overnight in this department.

Johnson Wire Speeds Overnight Delivery Of Handmade Springs

A spring maker who built a flourishing business by filling small orders practically overnight uses Johnson Steel & Wire Company's Music Spring Wire exclusively.

President L. V. Barnes of The Yost Superior Company, Springfield, Ohio, says flatly:

"Johnson Music Spring Wire is best." Since 1924, when a merger of Superior Spring Co. and Yost Gearless Motor Co. formed The Yost Superior Co., the firm has concentrated on producing custom-made springs and wire forms.

In one day recently, five telephoned orders for small lots of springs all specified the quickest possible delivery. "Three of those orders went out the same day and the other two were shipped the next morning," said William H. Craig, secretary-treasurer who heads production and purchasing activities.

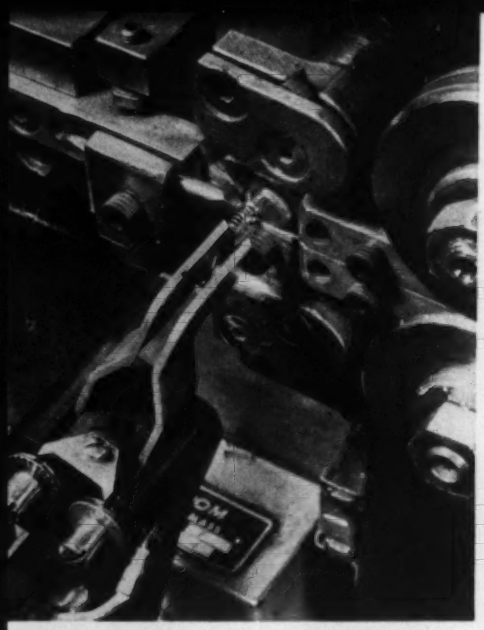
Three factors are all-important to Yost Superior. They are:

● **Spring Making Skill** — Yost Superior's bonus incentive plan, the long tenure of its employes and its steady growth for more than a half-century all demonstrate the company has a skilled work force which knows and practices the art of spring making.

● **Sizable Inventory**—Large wire stocks, usually running around 500 tons, are always on hand in Yost Superior's stock room. Mr. Craig said: "Our customers depend on us to supply their needs quickly. That means large stocks of wire sizes commonly used." He added:

"Johnson Music Spring Wire is so good—consistently—that we feel confident in laying in a large supply. We don't worry about quality varying from coil to coil or shipment to shipment. We can depend on wire we buy today to match the properties and performance of wire we bought a year ago.

"When we order from Johnson,



Electronic gager on this Torrington W10A Coiler measures to .005 inch in determining whether each spring coiled is the proper length. Springs rejected by the gager are blown to the side while good springs fall into container. Spring being coiled is made of .010 inch Johnson Music Spring Wire. It has an O.D. of .121 to .126 inch and is 5/16 inch long. It takes 1,000 springs to weigh a quarter pound.

Coiling a long spring on a Torrington W12A coiler from Johnson .120-inch diameter Music Spring Wire. The 95 coils in this spring measure 30-1/2 inches in length. Each coil has an O.D. of 1-1/16 inches

their wire is the best. One hundred percent testing of finished springs proves it.

"We're accustomed to holding the diameter of springs — and often spring lengths — to tolerances stated in thousandth's, so we've got to have good wire. Johnson Music Spring Wire helps us meet specs and its performance helps us meet load requirements."

While Yost Superior makes springs in large production runs for everything from grass seed spreaders to missiles and rockets, its Hand Department is a key operation.

In the Hand Department where orders for less than 100 springs or wire forms are filled, Johnson Music Spring Wire proves itself.

Coiling springs by hand means high labor costs so it's important to keep them down to a minimum or the cost of making a few springs would go sky high. Here cost of the wire is insignificant but quality of the wire is most important.

• Quality Comes Through — That's because there's little or no time for experimenting or trial runs The Hand Department pays off because the spring maker knows his business and uses Johnson Steel Wire with its predictable performance qualities.

Yost Superior uses the full range of Johnson Music Spring Wire from .008 inch diameter up to 250 inch to make all kinds of compression, extension and torsion springs as well as a bewildering array of wire forms

That's a good recommendation for any spring maker. Whatever your needs for Music Spring Wire or any other fine wire specialty, you can count on Johnson Steel & Wire Co to give you the same consistent quality and good service which pleases Yost Superior.

You can get better wire and better products, starting today Just call the nearest district sales office, listed here, and talk to a Johnson man who knows wire and production problems.

Grinding of spring ends on a Besly Grinder. These compression springs, made of .047 inch O.D. Johnson Music Spring Wire, are only 9/16 inch long and have an O.D. of 13/32 inch. On this machine, the closed ends are being ground square.

Coils of Johnson Music Spring Wire are delivered to the Coiling Department from Yost Superior's large stock room. The company normally carries an inventory of about 500 tons of wire.

we get quick delivery from warehouses in Akron or Chicago."

• Good Raw Materials — President Barnes said: "We demand the utmost in uniformity of diameters, finishes, tempers and physical properties. We get it from Johnson Steel & Wire Co.

"We don't have to ask for service. It's given us without asking. And Johnson Music Spring Wire has worked well for us. I would say

Johnson Steel & Wire Company, Inc.

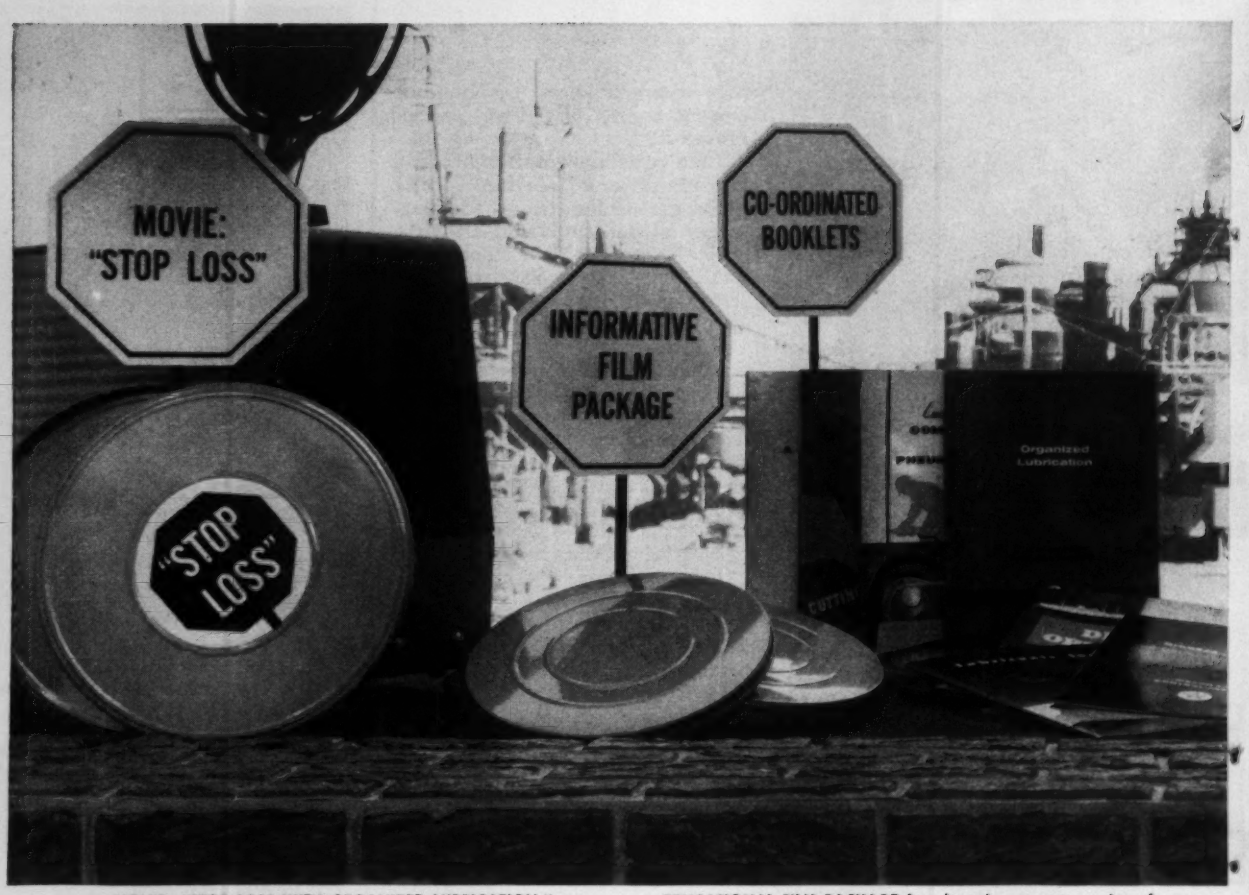
Worcester 1, Massachusetts

a subsidiary of **Pittsburgh Steel Company**

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Akron	Cleveland	Detroit	Los Angeles	Pittsburgh
Chicago	Dayton	Houston	New York	Tulsa
			Philadelphia	Warren, Ohio



MOVIE: "STOP LOSS WITH ORGANIZED LUBRICATION," a new 20-minute color-and-sound film created to show the opportunities for cost control through Organized Lubrication.

EDUCATIONAL FILM PACKAGE for plant departments consists of movies on greases, hydraulic oils, cutting oils, etc., that may be selected after seeing the "Stop Loss" film.

HERE ARE THE TOOLS THAT CAN HELP YOU

INCREASE YOUR NET PROFITS

Texaco's new "Stop Loss" program is designed to cut maintenance costs by modernizing lubrication practices. If yours is an average plant, the results can add 4 per cent to your net profit.

Even if your plant is an efficient operation, it is still virtually certain that there is an opportunity for cost control you are overlooking—either partially or completely. Here's what the Small Business Administration says in a recent publication:

Suppose there is an average plant, which sells $1,000,000 worth of goods per year. The net profit of this average company would be $73,400 and the maintenance cost would be $29,900. Now, suppose that by *better lubrication*, maintenance costs are reduced 10%, or $2990, *the $2990 will go directly into profit*—an increase of 4%.

A Texaco "Stop Loss" Program is designed for you. Texaco has developed a program specifically designed to help cut your maintenance costs via better lubrication practices. It will help you increase machine life, minimize downtime, reduce lube inventory, even cut purchasing costs. And the savings you make go directly into profits.

CO-ORDINATED BOOKLETS on the film subjects and others can be used as guides in specific areas.

TEXACO LUBRICATION CONTROL SYSTEM takes the guesswork out of your lubrication scheduling. It costs almost nothing to install, yet can add thousands of dollars a year to profits.

BY AS MUCH AS 4 PER CENT!

Can your plant pass this test? If the answer is "no" to any of the following questions, it is almost certain that a Texaco "Stop Loss" Program can improve your profit picture.

1. Is there a central source of responsibility in your plant for *all* lubrication? Yes ☐ No ☐
2. Can your machine operators devote all their time to production without worrying about lubrication? Yes ☐ No ☐
3. Is there any system for making sure that equipment gets lubricated in the right spots at the right time? Yes ☐ No ☐
4. Have you had a lubrication study made to eliminate costly duplication of lubricants? Yes ☐ No ☐
5. Are your oilers qualified men with knowledge of mechanisms lubricated? Yes ☐ No ☐

See for yourself how "Stop Loss" works! Texaco has just released a new color-and-sound movie to dramatize the benefits of good lubrication practices. It's called "Stop Loss through Organized Lubrication" and we think it would be valuable to you to see it. For a showing in your plant soon, mail in the coupon today!

Texaco Inc., 135 East 42nd Street, New York 17, N. Y.

MAKE YOUR RESERVATION TODAY!

TEXACO INC., Dept. S-161
135 East 42nd Street
New York 17, New York

I would like to see "Stop Loss through Organized Lubrication." Please call to arrange a showing in my plant.

Name_____ Title_____

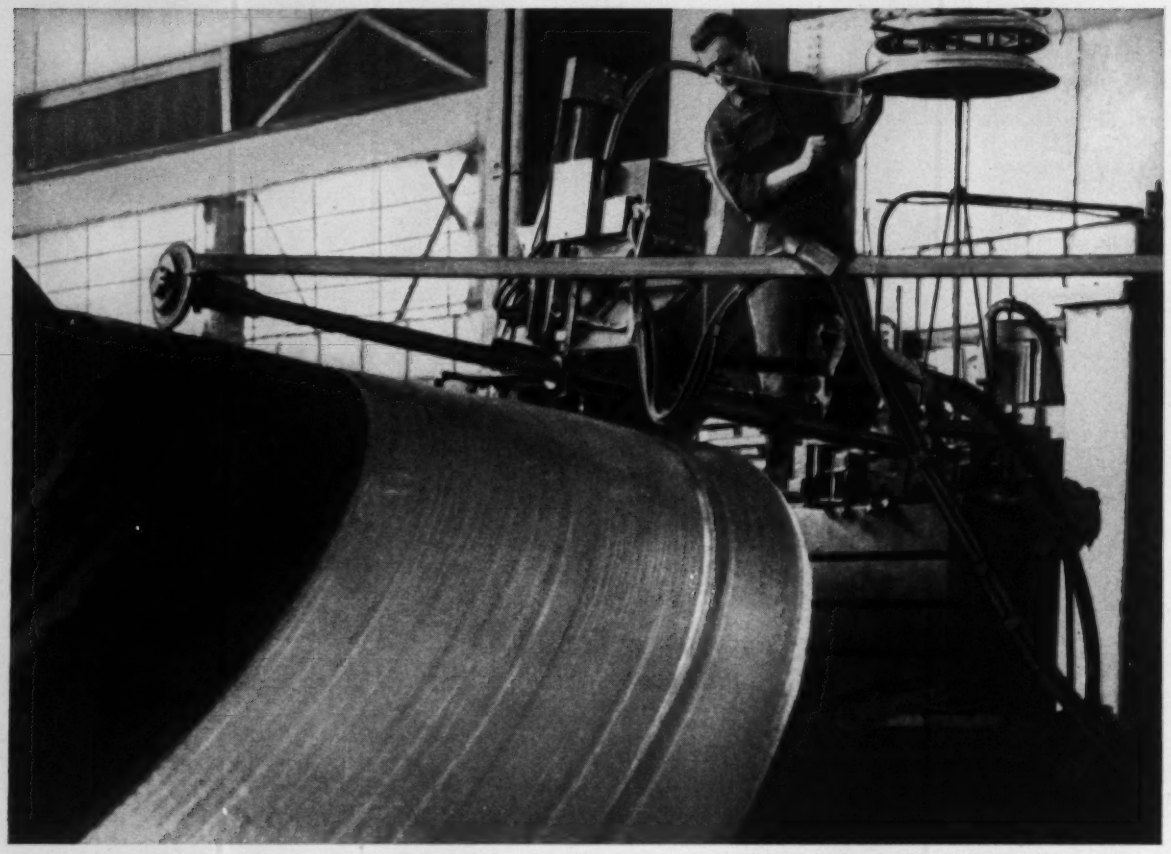
Firm_____

Address_____

City_____ Zone____ State_____

TEXACO

METALS LIVE LONGER...WHEN HARD-FACED WITH "HAYNES" ALLOYS



Submerged-arc welding equipment here deposits HAYNES hard-facing alloys on large areas of a 15-foot diameter blast furnace bell, to resist abrasion, impact, erosion.

Hard-Facing BIG Areas . . . Rapidly

Many big jobs are now being hard-faced with standard submerged metallic-arc equipment—using HAYNES alloys. The advantages: high rate of deposition, up to 20 pounds per hour; large cross sections faced without pre-heating; minimum deposit dilution by use of multiple layers.

For hard-facing gyratory crushers, blast furnace bells and hoppers, crusher rolls and jaws, tractor rollers—wherever impact, abrasion, heat, corrosion, erosion are problems—HAYNES alloys in drawn-tube rod form give the desired properties. They feed smoothly and uniformly.

Many smaller-area hard-facing jobs, too, are being done faster and at lower cost, on a production-line basis. Whether you hard-face large areas or small—whatever your hard-facing job is—it will pay you to insist on HAYNES rods. Our field engineers will gladly help you solve your hard-facing problems. Write us today!

HAYNES
ALLOYS
HAYNES STELLITE COMPANY
Division of Union Carbide Corporation
Kokomo, Indiana

UNION CARBIDE

Address Inquiries to Haynes Stellite Company, 270 Park Avenue, New York 17, N. Y.

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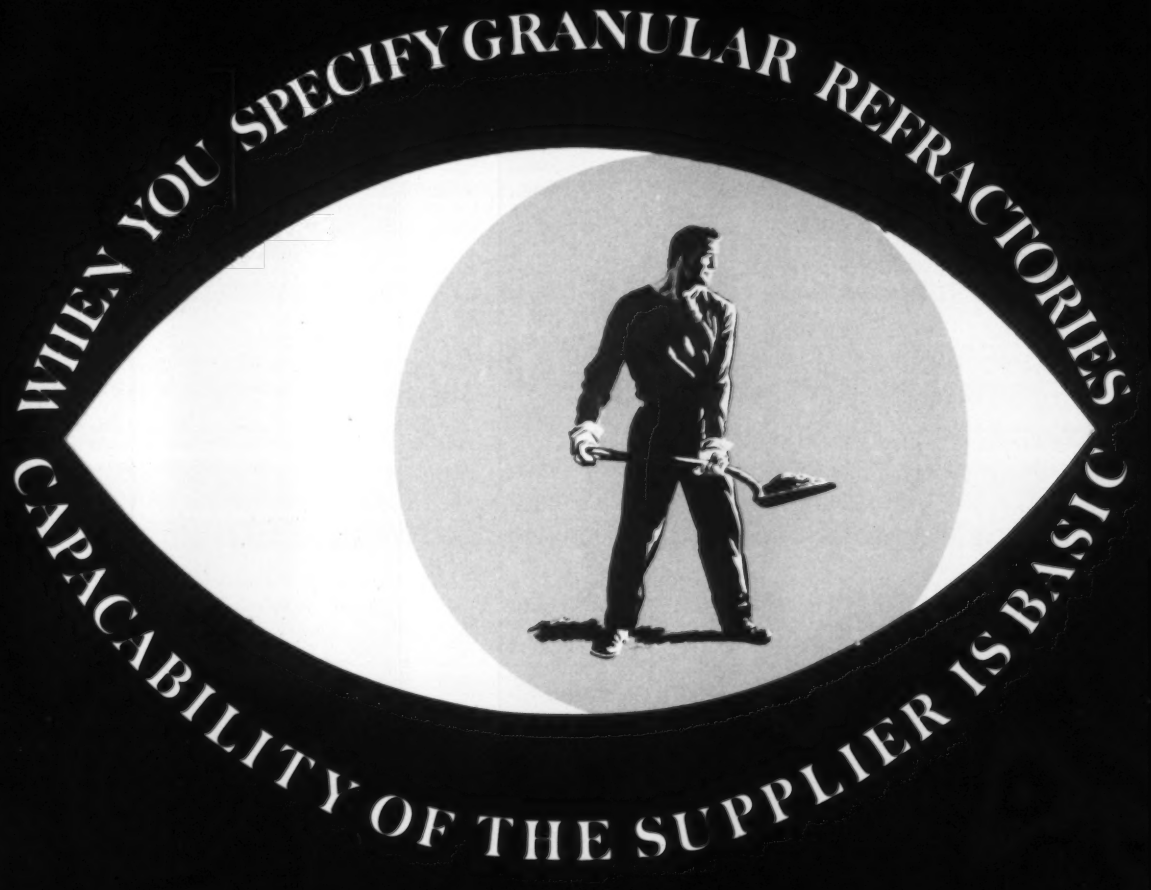

WHEN YOU SPECIFY GRANULAR REFRACTORIES
CAPACABILITY OF THE SUPPLIER IS BASIC

capac

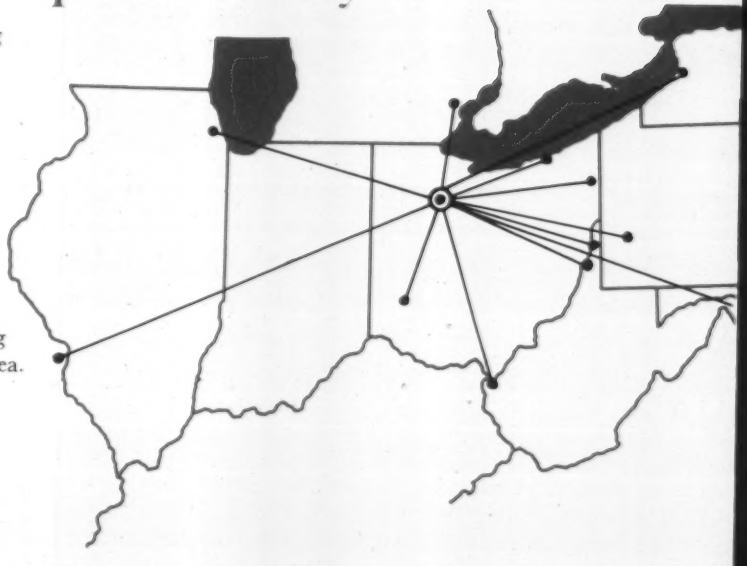
ability

basic's capacity and ability to provide steelmakers with better granular and tar-bonded refractories

with capacability...quick delivery

Almost exactly in the heart of steelmaking America, Basic's main plant at Maple Grove, Ohio ships refractories virtually at the flick of a finger. Its strategic location on two rail lines—at the junction of the Pennsylvania and Nickel Plate Railroads—is another reason why *you can look to Basic* as a quick and absolutely dependable source of supply.

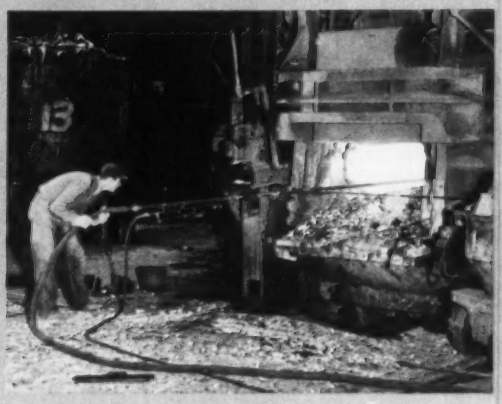
For the convenience of Midwestern steelmakers Basic maintains a distribution center at Hammond, Indiana . . . providing delivery within minutes to the Chicago area. Extensive facilities at Gabbs, Nevada serve Western steel producers with a complete line of magnesia refractories.



ability basic's w with be

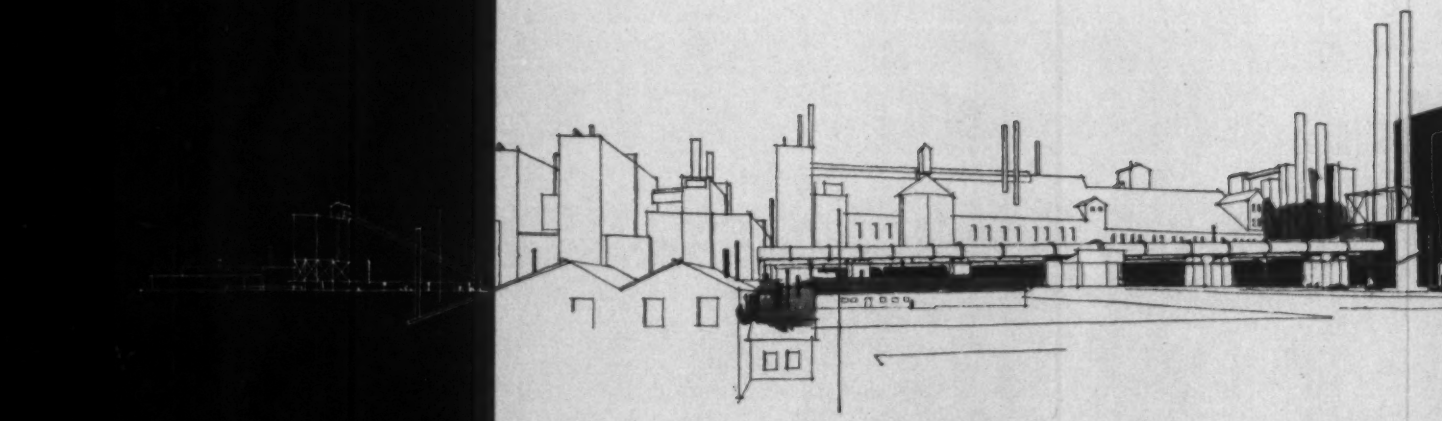
DEAD-BURNED DOLOMITE

Basic's dead-burned dolomites, MAGNEFER and SYNDOLAG are used for routine furnace maintenance in virtually every open hearth and electric shop in the country. The reasons: uniformly high quality and outstanding performance—the result of continuous control during manufacture . . . carefully washed ore . . . accurately sized grains . . . precise blending and burning.

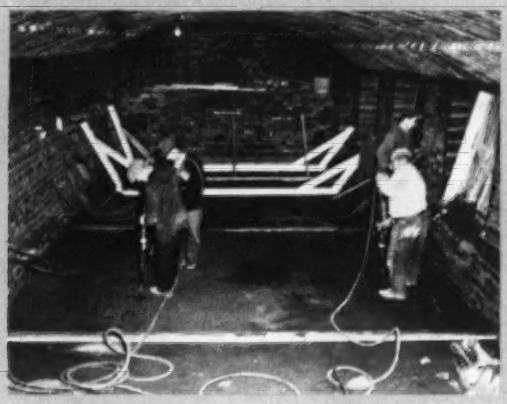


BASIC GUN REFRACTORIES

Such outstanding Basic gun refractories as GUNDOL and GUNMIX have contributed immeasurably to quicker, less expensive furnace maintenance. In many cases refractory costs are cut in half, with less labor and downtime . . . using only one material for both slag line and furnace wall maintenance.



vision to supply steelmakers etter refractory products



SPECIAL MAGNESIA REFRACTORIES

Basic's ramming refractories, RAMSET and RAMICLASE have become the standard of comparison for open hearth and electric furnace bottom performance. Steelmakers know they can depend on Basic's proven ramming mixes for both original hearths and hot and cold furnace maintenance. Other easy to use maintenance materials like SHOVELPATCH save furnace time and extend lining life.

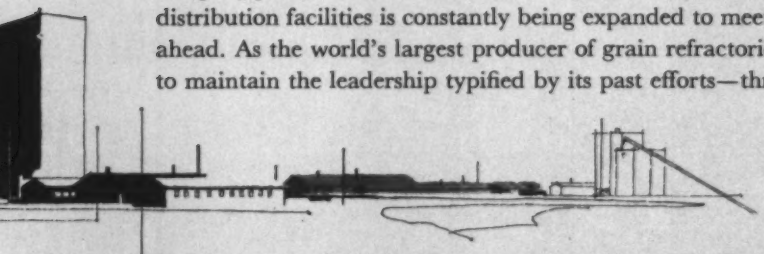
TAR-BONDED REFRACTORIES

Basic's tar-bonded refractories, TARBLOK and TARMIX are comprised primarily of dead-burned dolomite from Maple Grove and/or dead-burned magnesite from the company's Gabbs, Nevada facilities. Produced in a special plant, Tarblok and Tarmix are shipped to practically every oxygen steel producer in the Western hemisphere.

basic reflects capacability...

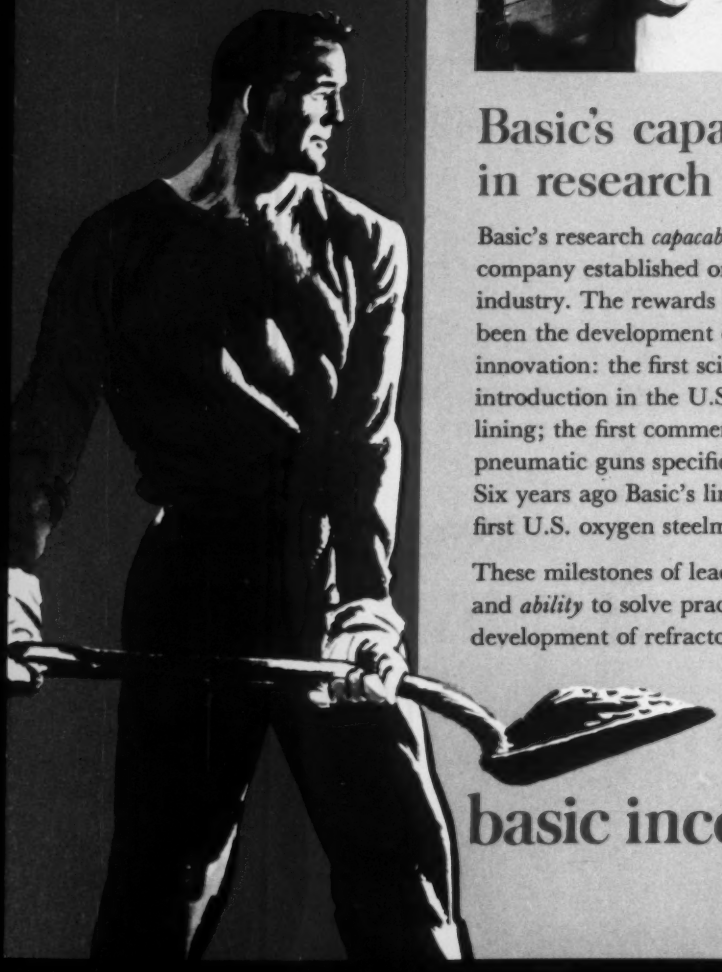
the *capacity* to manufacture and deliver quality refractories—the *ability* of talented and creative people to do a better job through vision, resourcefulness and skill. With capacability, Basic better serves the changing needs of steelmakers with a complete line of more than thirty hearth lining and maintenance materials—dead-burned dolomites; ramming, gunning and patching refractories; and tar-bonded linings for the new oxygen furnaces.

Keeping pace, our broad network of eight development, manufacturing, and distribution facilities is constantly being expanded to meet the challenging decades ahead. As the world's largest producer of grain refractories, Basic will continue to maintain the leadership typified by its past efforts—through capacability.



basic incorporated

HANNA BUILDING
CLEVELAND 15, OHIO



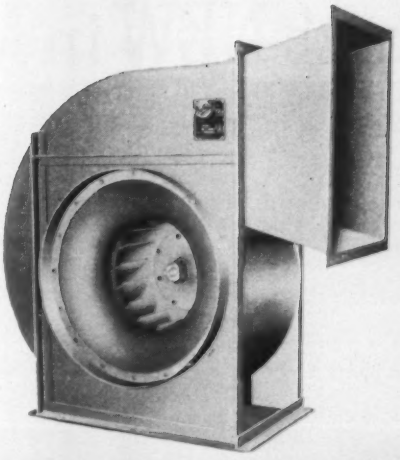
Basic's capacability in research and development

Basic's research *capacability* goes back to the early 20's when the company established one of the first laboratories in the refractory industry. The rewards of Basic's continuing research have been the development of virtually every major grain refractory innovation: the first scientifically prepared dead-burned dolomite; introduction in the U.S. of magnesia ramming mixes for hearth lining; the first commercial basic gunning refractories and pneumatic guns specifically designed for furnace maintenance. Six years ago Basic's lining refractories were used in the first U.S. oxygen steelmaking furnace.

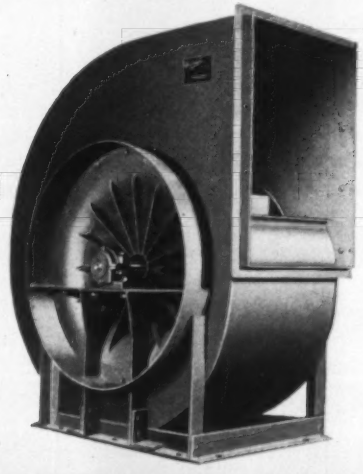
These milestones of leadership reflect Basic's *capacability*—its *capacity* and *ability* to solve practical problems . . . to spearhead the development of refractory technology for a dynamic steel industry.

basic incorporated HANNA BUILDING CLEVELAND 15, OHIO

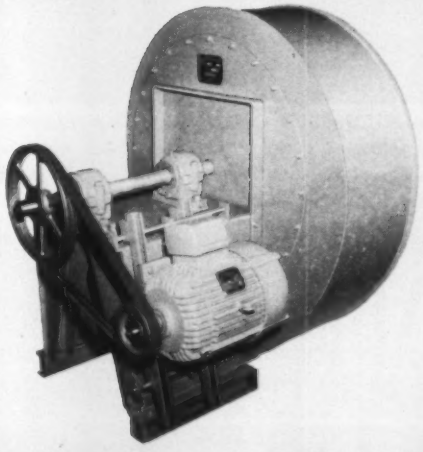
Realize the Lower Cost of Quality Fans



"Buffalo" Type "CR" Fan



"Buffalo" Type "BL" Fan



"Buffalo" Industrial Exhauster

Without a doubt — the dependable performance of quality built fans pays off in longer, more effective, trouble-free service. At Buffalo, we call this the "Q" factor . . . the highest quality you can get. Here are 3 examples of what this can mean to you . . .

For supplying moderate pressure ventilating, air conditioning and air cleaning systems, the "Buffalo" Type "BL" Fan is ideal. From inlet through wheel to housing, the "BL" is engineered for quiet, efficient, economical operation. The "Buffalo" designed non-overloading characteristic assures stable output from free delivery to shutoff. Buffalo's traditional durable construction assures long, maintenance-free life. Capacities to 500,000 cfm. Write for Bulletin F-104.

For severe industrial service the "Buffalo" Type "CR" Fan is unsurpassed. Fan efficiency is increased by the same design factors that reduce wear to a minimum. A unique radial blade plus maximum streamlining through the entire fan accomplishes this dual purpose. Long, productive fan life is assured by Buffalo's extra-heavy duty construction throughout. For full details, write for Bulletin FD-205.

For rugged air and material moving jobs you can rely on "Buffalo" Industrial Exhausters. Special units will move hot gases from 200° F. to 850° F. For handling corrosive fumes, actual users prove that "Buffalo" Rubber-Lined Exhausters will outlast standard metal fans as much as twelve to one. Efficient material wheels are available for moving emery dust, saw dust, chips, long shavings and many other materials. There's a "Buffalo" Industrial Exhauster to fit your "tough" application. Write for Bulletin FI-110.

For full information on these and every type "Buffalo" Fan, call in your nearest "Buffalo" Representative. Or write us direct, outlining your air moving problems.

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Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

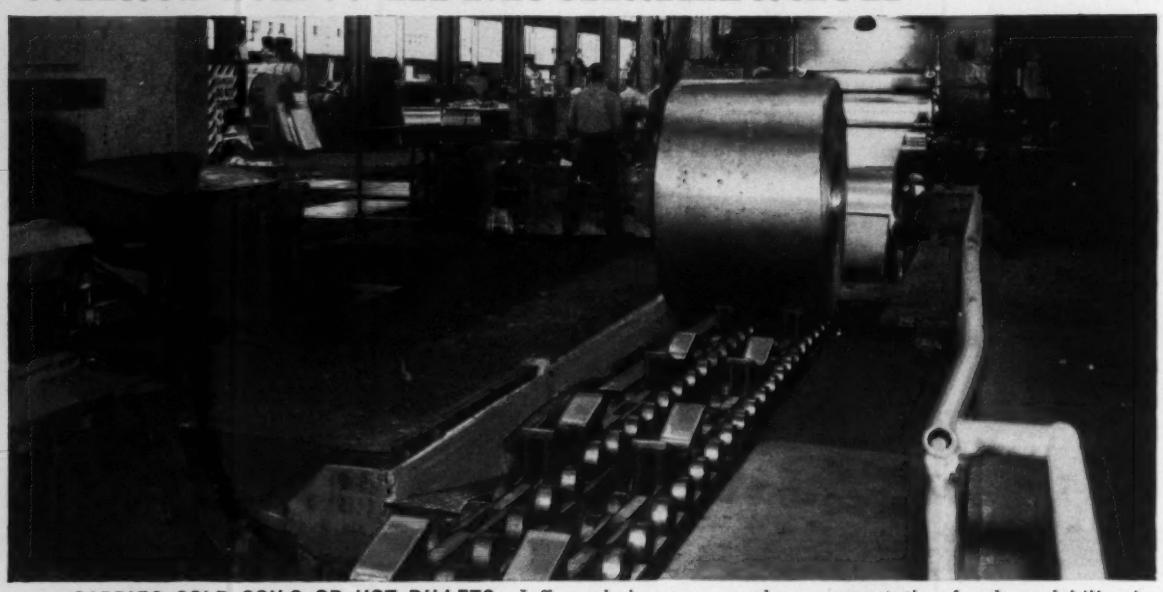
'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

'Buffalo' Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

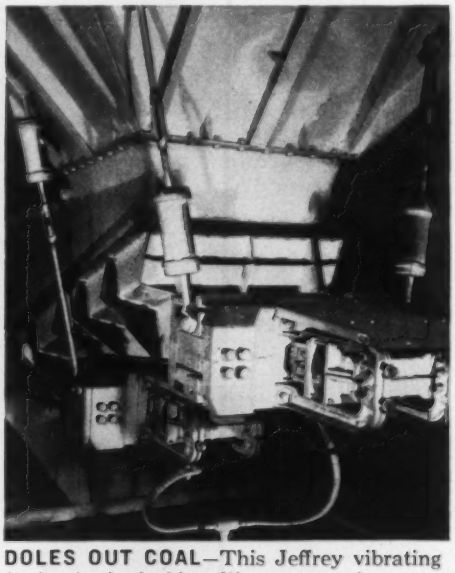
Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

What's NEW in Mechanization



CARRIES COLD COILS OR HOT BILLETS—Jeffrey chain conveyors have a reputation for dependability in handling all types of materials. Steel mill chain, sugar mill chain, lumber handling chain—all are individually designed for the specific job to be done. Thus Jeffrey produces hundreds of types and sizes of chain to match industry's needs.

MAINTENANCE SAVER—A belt conveyor that carries thousands of tons of abrasive materials each day rolls on these Jeffrey Permaseal Idlers. Yet greasing intervals are measured in *years*. A unique Jeffrey design completely seals the bearings to cut maintenance cost to the bone.



DOLES OUT COAL—This Jeffrey vibrating feeder, in the fuel handling system of a power plant, not only feeds the coal but doles it out at preset rates. Thus material flow is automatically controlled to minimize costs.

Jeffrey serves *every* basic industry with *mechanization* ... conveying and processing equipment, transmission and mining machinery. Sales-engineering service world-wide; standard products stocked by authorized distributors.

The Jeffrey Manufacturing Company, 889 North Fourth Street, Columbus 16, Ohio.

Mechanization
for every basic industry

JEFFREY

ANOTHER NORTON PRODUCT

IT'S NEW IT DOES A JOB

And How!

The BEAR-TEX Wheel

. . . *Newest Aid for Metal Finishing*

Here's a BEAR-TEX Wheel, on an oscillating spindle, providing a uniform, streak-free finish on flat sheet.

What is it?

It's a completely new product . . . a wheel formed of non-woven fabric, impregnated throughout with grain and adhesive. Used dry or with lubricant, under light pressure at speeds of 2000 to 3000 sfpm.

What does it do?

With a BEAR-TEX Wheel you remove light scale or rust. You produce matte or satin finishes. For example: satin finishing bright rolled metals . . . or blending fabricated steel parts to match No. 3 or No. 4 finish . . . or applying decorative satin finishes to non-ferrous sheets. It's so new, no one yet knows how much it can do! But we do know, on the above jobs, you do them fast, beautifully, inexpensively.

How many kinds?

There's a wide assortment of BEAR-TEX Wheels available. Silicon carbide or garnet grains. Medium, fine, very fine. Soft or medium resiliency. Diameters from 3 to 16 inches. Widths from 1 through 50 inches. And a variety of center holes.

Want a try?

Good. Just write Dept. S-10 for a demonstration. BEHR-MANNING CO., Troy, N. Y., a division of Norton Company.

BEAR BRAND *Abrasives*

OUTSIDE...

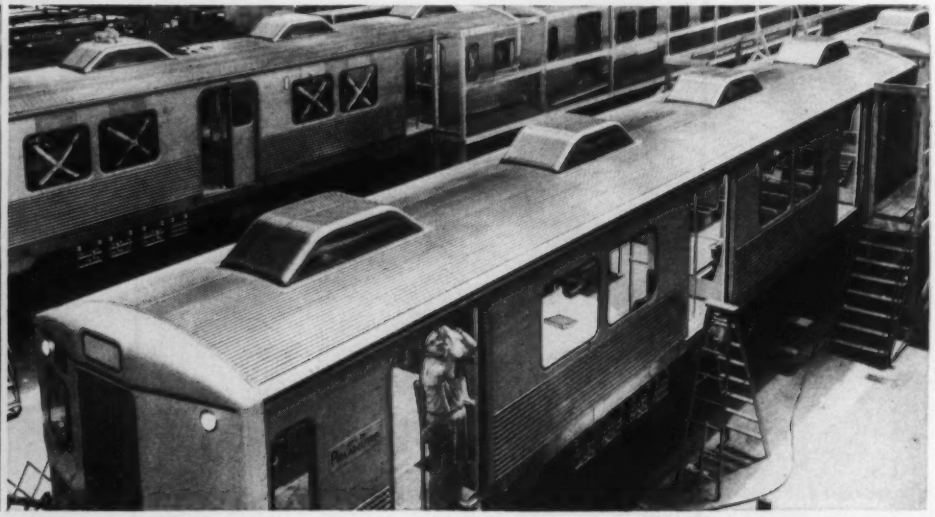
It's literally true that Stainless Steel trailers do not wear out before they become obsolete. Some of them have logged over a million miles. Once, a load of lampblack in a Stainless trailer caught fire and burned for five hours. Wheels, bearings, brake linings, drums (and cargo) were completely destroyed. They were replaced and the trailer body is still in service.

Water, harsh marine or industrial atmospheres can corrode and rot trailer bodies of other materials. Not Stainless. And Stainless Steel is strong—it has a yield point almost four times greater than competitive materials, so Fruehauf engineers (who designed this trailer) can design thinner, lighter walls, roof and braces. Strength goes up, and so do payloads and profits. Maintenance costs go down. The trailer shown here is 40 feet long, is built of type 302 Stainless, and is the strongest, lightest trailer in its class.

INSIDE...

In Philadelphia, 270 sleek new Stainless Steel subway-elevated cars are in process of going into service, with more than 100 already running. Manufactured by The Budd Company of types 201 and 202 Stainless, they were designed to win new riders to mass transportation, yet they will be cheaper to operate and maintain than any similar rapid transit cars ever built.

These cars will be exposed to all kinds of atmospheres—from the dampness of the underground tunnels to the sleet, rain, snow or hot sun above ground. But they'll always look new and shiny—because they're Stainless Steel. A quick hosing-down will keep them looking that way, and costly painting will be eliminated because Stainless Steel keeps its good looks. And the Philadelphia Transportation Company will save in other ways too: since these new cars weigh only 49,000 lbs., it won't take as much power to run them. Savings in maintenance and operation will add up to some $6,500,000 over the 30-year depreciated lifespan of the fleet.



...and in between

Only Stainless Steel offers designers and fabricators this unique combination of properties: great strength, extraordinary corrosion resistance to an enormous variety of reagents, outstanding high temperature properties, and good appearance. It is easily fabricated, and it actually costs less in the long run because it lasts longer. For unmatched efficiency, durability, ultimate economy, specify Stainless Steel. For a wide selection of Stainless Steels and for prompt delivery ask your USS representative or nearest steel service center.

USS is a registered trademark

This mark tells you a product is made of modern, dependable Steel.

United States Steel Corporation – Pittsburgh
American Steel & Wire – Cleveland
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Columbia-Geneva Steel – San Francisco
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Supply – Steel Service Centers
United States Steel Export Company

United States Steel

Stainless Steels . . . no other metal makes such a material difference in so many applications

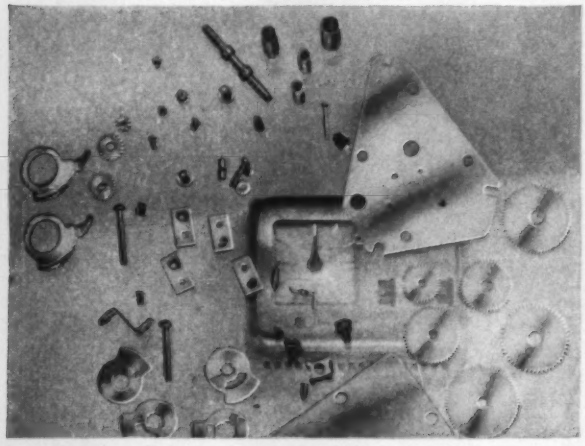
"High-speed automatic screwdriving started with Chase 3-Mark Rod"

says Grant Tuttle, Purchasing Agent of American Screw Company, Willimantic, Connecticut... maker of "Screwstick." This bright, time-saving idea loads an automatic screwdriver with a stick of screws . . . lets an individual operator turn out up to five times as many assemblies, compared with older methods.

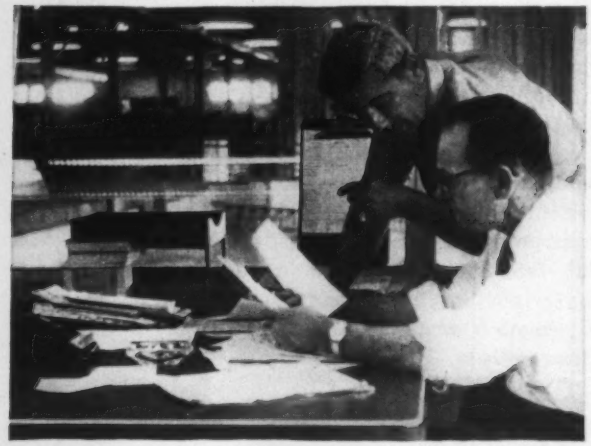
Mr. Tuttle adds: "Screwsticks are cut from Chase 3-Mark Free-Cutting Brass Rod. We insist that the rod be absolutely uniform in size to avoid jam-ups in the driver. Tensile strength of each length of rod must be uniform, too... since finished screwsticks rely on torque to snap off each screw at precisely the right instant. And end-to-end straightness is just as critical. Because no other free-cutting brass rod is so dependably uniform and straight, American Screw Company uses nothing but Chase 3-Mark Rod."

Ask your Chase representative for full details about 3-Mark, or check and mail the coupon at the right. Learn today about the finest free-cutting brass rod anywhere.

A CHASE "PLUS" for users of sheet and strip in coils... new water-resistant shrouding paper that protects metal against damage, staining, oxidation. Metal arrives in excellent, ready-to-work condition.



CLOCKWORK ACCURACY in thermostat parts comes from Chase Brass strip, with its extremely close dimensional tolerances. General Controls Company of Burbank and Glendale, California, also gets corrosion resistance, with no protective coating needed.



CHASE SERVICE is available at any one of the largest network of warehouses in the industry. Bring ALL your non-ferrous and stainless metals needs to the nearest Chase Multi-Metals Service Center (listed at right) your headquarters for metals and service.

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Tel. PLaza 2-2565

BOSTON 4, MASS.
411 "D" Street
Tel. LIberty 2-0126

CHICAGO 39, ILL.
5401 W. Grand Ave.
Tel. TUxedo 9-4000

CINCINNATI 2, OHIO
222 Post Square
Tel. PArkway 1-3326

CLEVELAND 3, OHIO
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Tel. HEnderson 2-2300

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☐ Aluminum Stock List ☐ Stainless Steel Stock List
☐ Sheet & Strip Brass ☐ 3-Mark Free-Cutting Brass Rod
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New from Wright!

Built-In Overload Protection for Operator, Load and Hoist with the New Wright Overload Cutoff*!

• Now, for the first time on any electric hoist, you can have safe, sure, mechanical overload protection as a built-in feature with the **WRIGHT Overload Cutoff.** Designed and built to fit any new WRIGHT *Speedway* Electric Hoist, the Overload Cutoff unit you see pictured above is a compact, integral part of the hoist frame itself. As a result, it becomes a functional part of the hoist *at no sacrifice in headroom.* The WRIGHT Overload Cutoff is simple in design and should give dependable, trouble-free operation during the entire life of the hoist under normal operating conditions. Calibrated and sealed at the factory for the user's protection, the unit takes rugged abuse up to the critical point of overload—then instantaneously "breaks" the raising circuit of the hoist. This allows the load to be safely lowered to the floor and unhooked. Once this is done, the raising circuit of the hoist is again automatically restored.

The WRIGHT Overload Cutoff is available now as standard equipment on all new WRIGHT Frame 2 & 3 *Speedway* Electric Hoists, and as optional equipment on new Frame 1 & 1½ models.

Find out how WRIGHT *Speedway* Hoists equipped with Overload Cutoff can bring practical, fast-acting overload protection to your material handling operations. For complete information, write our York, Pa., office.

*Patent applied for

See your WRIGHT Distributor *about the Speedway Electric Hoist line or write us for Catalog E-58*

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Consistent Quality Has Benefits for You

The reputation of Roebling high carbon flat spring steel is based on two uncompromising facts: its unexcelled dimensional and mechanical uniformity.

They are qualities that contribute immediately and directly to *your* increased production rates and decreased rejects.

You are taking advantage of a collection of benefits when you specify Roebling. Write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey, for complete information.

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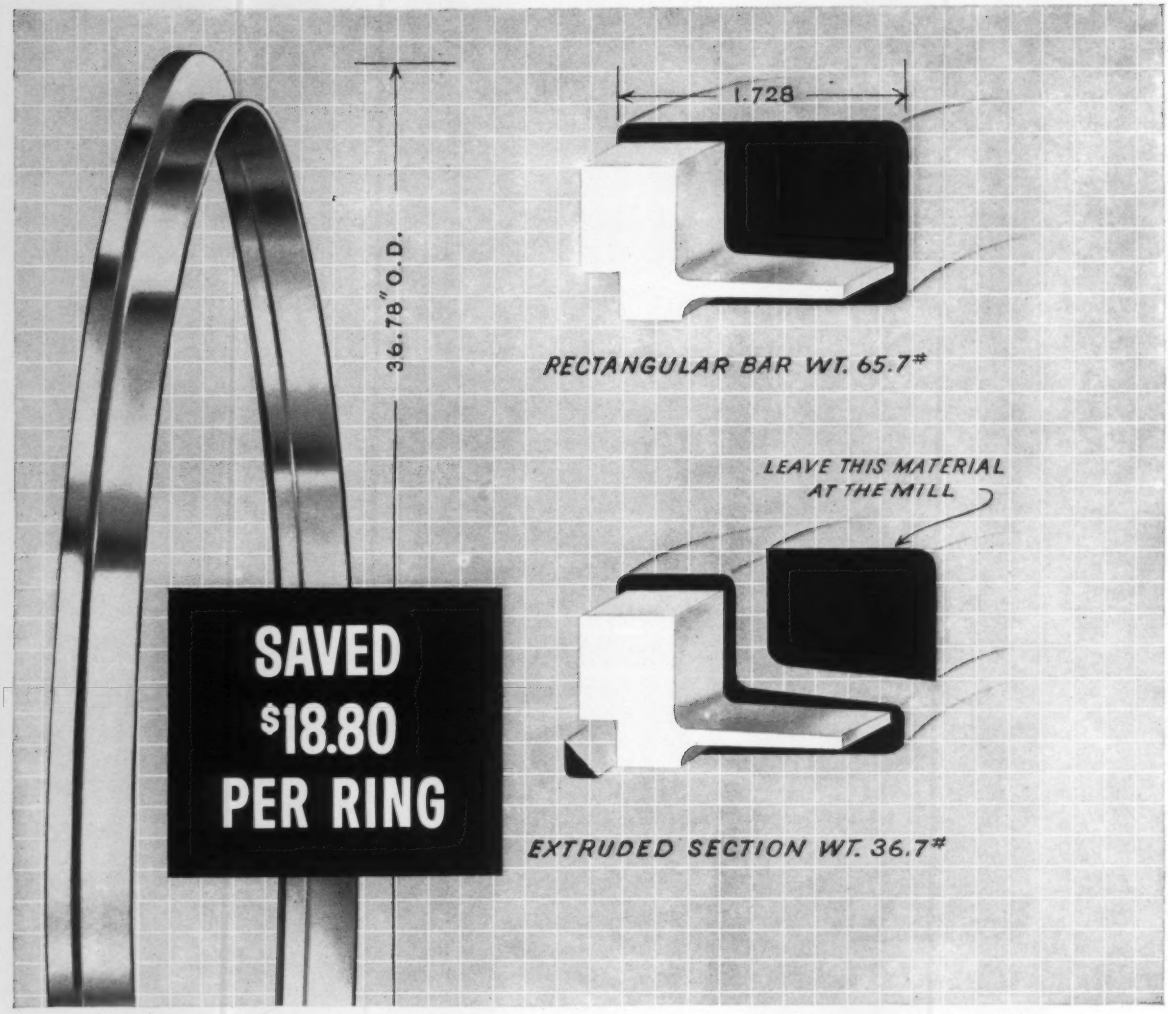
Roebling... Your Product is Better for it

Roebling high carbon flat spring steel is used for a wide variety of parts.



Flash butt-welded rings cut the amount of stainless 321 required by 50%

Using a special extruded section, 29 lbs. of stainless 321 were eliminated —plus the extra hours of expensive machining required to hog it out.

Amweld is equipped to supply flash butt-welded rings and circular products in stainless, titanium, aluminum, as well as a wide variety of corrosion-resistant alloys. If you would like to know more about Amweld's welding, fabricating and complete machining facilities, phone or write.

GET THE FACTS ABOUT AMWELD

New 20-page catalog describes flash butt-welded rings and circular products manufactured by Amweld. Also booklet entitled, "How Flash Butt-Welded Rings are Made."

AMWELD® INDUSTRIAL PRODUCTS

THE AMERICAN WELDING & MFG. CO. • 110 DIETZ ROAD • WARREN, OHIO

Republic's White Sees Fourth Quarter Pickup

Fourth quarter steel ingot production should total about 24 million tons, bringing the 1960 total to nearly 105 million tons, predicts Charles M. White, chairman, Republic Steel Corp. That indicates operations at about 65 per cent of capacity. Mr. White also reports that Republic's 1960 capital outlays will total a record $158 million—the figure budgeted at the beginning of the year. In one capital expenditure, Republic and Armco Steel are jointly boosting pelletized iron output at upper Great Lakes facilities.

Jessop's Rackley Predicts Steel Price Hike

"It is only a matter of time until we find it necessary to increase prices," Frank B. Rackley, president, Jessop Steel Co., told the Washington (D.C.) Purchasing Agents Association. He pointed out that the steel industry urgently needs relief from rising costs. Mr. Rackley also told the purchasing agents that in the future they will buy more specialty steels from warehouses than from mills. Reason: The need for more and more kinds of steel.

Hanley Compares U. S. and Western Europe

"The contrast between the U. S. economy and busy Western Europe is surprising. Obviously in some areas, we have priced ourselves out of the market, and perhaps this is more serious than we realize." So stated E. J. Hanley, president, Allegheny-Ludlum Steel Corp., before a University of Pittsburgh executive gathering. He says the people of Western Europe are not only hard at work—they are hard working. "Motivation is high, and output of products is moving up at a tremendous rate."

August Strikes at Postwar Low

Fewer strikes began in August, 1960, than in any August since World War II, the Labor Department reports. There were fewer strikes during 1960's first eight months than in the like period of any postwar year except 1954 and 1958.

Canadian PAs See More Inventory Cutbacks

Despite the continued decline in inventories of materials, 41 per cent of the buyers polled by the Canadian Association of Purchasing Agents say they'll

make further inventory reductions. Only 16 per cent plan buildups. New orders rose in September (vs. August) for 32 per cent of the firms, declined for 26 per cent.

How Manufacturers Rank Their Problems

The cost-price squeeze is the toughest problem facing U. S. manufacturing firms today. So finds a survey of 760 manufacturing firms by Dun & Bradstreet. Here's the ranking (showing the percentage of executives who ranked each problem as the single most important issue they face today—and five to ten years from now):

	Now	5-10 Years		Now	5-10 Years
Cost-price squeeze	27.0%	21.3%	The November election	2.5%	
Foreign competition	16.4	22.2	Preserving free enterprise	2.5	2.4%
Excessive union power	8.9	9.7	Lack of capital	0.0	0.0
International tensions	8.4	9.5	Excess production capacity	2.2	2.4
Taxes	7.8	8.0	Government spending	1.0	1.0
Inflation	6.6	7.4	Domestic competition	0.0	0.0
Government regulation	5.0	5.3	Uncertainty	1.0	0.4
Recession & falling sales	3.6	2.4	All other issues	7.1	8.0

Six Questions You Should Ask Yourself

C. E. Schooley of American Telephone & Telegraph Co. told a Magnesium Association meeting in Cleveland that managers should ask themselves these questions: 1. Am I looking at my product in the broadest possible terms? 2. Am I looking at it in terms of the customer's needs and wants? 3. Am I doing consistent, long term research? 4. Am I working for strong future growth? 5. Am I developing intelligent, aggressive executives? 6. Am I competing for the consumer's dollar as imaginatively and effectively as possible?

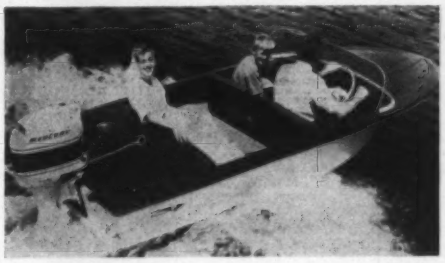
Machine Retrains People for Automation Work

Robodyne Div., U. S. Industries Inc., has developed a machine which uses automation techniques to retrain people replaced by automation for other work—in automation. Called Digiflex, it simulates keyboards used in automatic equipment.

USW Exploits Statistics in Short Workweek Bid

The United Steelworkers is promoting a theory that a 32 hour week would "actually mean a reduction in the average workweek of only about 3 hours." USW statisticians point out that the "average" steelworker spent only 35.3 hours on the job during the second quarter. That's true. What statisticians fail to mention is that there is no such thing as an "average" steelworker. The 35.3 hour figure results from some facilities being on three day and four day weeks and other employees being laid off during the quarter. Expect more statistical gerrymandering of this sort as the union continues to push for its shorter workweek.

Pleasure Boat Sales Down but Still Strong



This year's retail sales of outboard motors, boats, and boat trailers will total $442 million—down 5.2 per cent from last year's but up 5 per cent from 1958's. That's what executives told the Marine Trades Conference in Chicago.

Aluminum Making Bigger Splash in Boating Market

Look for aluminum to claim 40 per cent of the outboard boat market by 1965. That's the prediction of the Committee of Aluminum Producers which reports that aluminum boat sales are on the rise after holding at 120,000 units annually for several years. They predict:

1961 Boat Market		1965 Boat Market	
Total	370,000 units	Total	475,000 units
Aluminum	140,000 units	Aluminum	190,000 units
Glass fiber	120,000 units	Glass fiber	130,000 units
Wood	100,000 units	Wood	75,000 units
Royalite	10,000 units	Royalite	80,000 units

Steel Industry Profits Average 6 Per Cent of Revenues

The combined net income of iron and steel companies and their subsidiaries averaged 6 cents for each dollar of revenue during the last 25 years (1935-59), the American Iron & Steel Institute reports. The rate of profit varied from a loss of 0.9 cent in 1938 to earnings of 8 cents in 1940 and 1950. Total revenue during the quarter century: $199 billion. Net income: $11.9 billion. Total taxes: $15.3 billion (7.7 cents from each revenue dollar). Employment costs: $71.3 billion (35.8 cents). Materials, supplies, and freight: $90.2 billion (45.3 cents). Depreciation, depletion, and amortization: $9.3 billion (4.7 cents). Interest and charges: $1 billion (0.5 cent).

Chicago Loses Stature in Electronics

Chicago's electronics industry, world leader for decades, made the "wrong turn" and is doomed to become only a "peon"—making things that others develop. That's what Dr. F. E. Terman, vice president, Stanford University, asserts. "While other areas on the East and West Coasts were moving into the fields of computers, transistors, and Space Age developments, Chicago kept plodding along refining radios and TV sets," he declares.

Executive Attacks Conformity

"Can you imagine Jesus calling his disciples together and asking for a group decision on what kind of miracle to perform that day?" Jack Staehle, vice president, Aldens Inc., asked the Industrial Management Society in his attack on today's committee management fad. "Our conformity has made weaklings out of all of us," he asserts. He says our nation will lose by default "unless we become individuals again." He points out that "a successful nonconformist

conforms when possible. He only fails to conform when that is necessary to reach an objective. He is a courageous man."

USW Wants Steel Firms to Be Taxed on Foreign Operations

The United Steelworkers told the Tariff Commission last week that U. S. steel companies should pay income taxes on profits from their overseas ore operations, whether or not the money was transferred back to the parent company. The union suggested its plan would remove a certain amount of "artificial stimulation" for domestic steelmakers to go abroad for their ore.

U. S. to Sever Relations with Cuba?

As predicted (STEEL, Oct. 10, p. 86), the U. S. has halted all exports (including technical information) to Cuba—except medicine and nonsubsidized foodstuffs. Washington observers think it is the last step before cutting off diplomatic relations with the island regime.

Executive Job Openings Are Fewer, but Pay More

Big business is looking for fewer high-salaried executives than at this time last year, but the openings today pay more, a survey by Executive Manpower Corp. finds. An average of 2.2 top jobs per company (paying $10,000 to $75,000) will be available during the coming six months (vs. 3.5 jobs per company a year ago). Sales executives are in greatest demand, followed by production executives and engineering executives.

Straws in the Wind

Pennsalt Chemicals Corp. is marketing a new, chemical, color coating process for all metals. Pennsalt says it is economical and permits a single treatment to provide a surface highly resistant to corrosive chemicals . . . Home building credit became easier to get in September . . . Personal income in September edged up to a seasonally adjusted annual rate of $408.4 billion—$200 million above the August level . . . Princeton's Prof. John Turkevich says the U. S. has ten good scientists for every one in Russia . . . The Atomic Energy Commission predicts that $2 billion will be spent during the coming decade for reactor research, development, and construction . . . Lockheed Aircraft Corp. has eliminated 6240 clerical hours and saved $15,288 annually by preparing its weekly indirect labor report on a 709 computer.

Metalworking Pulse

The Business Trend: Industrial production in the latest period showed an unexpected gain of 2 points. Responsible were advances in steel and auto output and railroad freight carloadings. **Autos:** Production has expanded eight weeks in a row but cutbacks in fourth quarter schedules will soon end the uptrend. **Steel:** Since July 4, ingot production has gone over 1.5 million tons in 12 out of 14 weeks.

- **INDUSTRIAL PRODUCTION**
  - Week ended Oct. 15 . . . . 153†
  - Year ago 119
  - Details on Page 83
- **PASSENGER CAR PRODUCTION**
  - Week ended Oct. 22 . . 152,000*
  - Year ago 112 488
  - Details on Page 80
- **INGOT PRODUCTION RATE**
  - Week ended Oct. 23 . . 54.6%†
  - Week ago 55.4%
  - Details on Page 140

†Preliminary. *Estimated.

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From foundry cores to flower pots, Hevi-Duty ovens produce clean, uniform results

It makes no difference "what's in the oven" — all products benefit from the cleanliness and uniformity of performance of Hevi-Duty units. Further, while this uniformity benefits your products, you benefit from Hevi-Duty versatility.

Hevi-Duty offers the largest and most complete line of ovens and other heat processing equipment in the industry. There is a size and type oven to fit your specific requirements, and adapt to your over-all operation.

Why not ask your Hevi-Duty systems engineer to study your operation and recommend the unit that would be most efficient for you. He will be glad to to do it without obligation. There is a Hevi-Duty office near you.

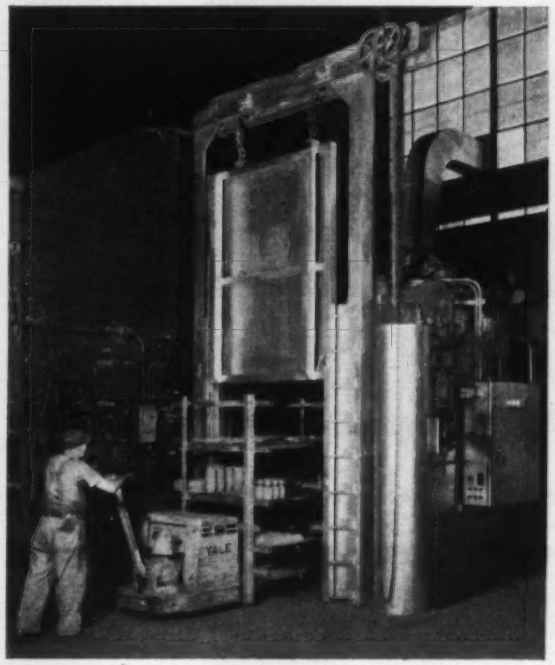
HEVI-DUTY

Electric and Fuel-Fired Industrial Furnaces and Ovens

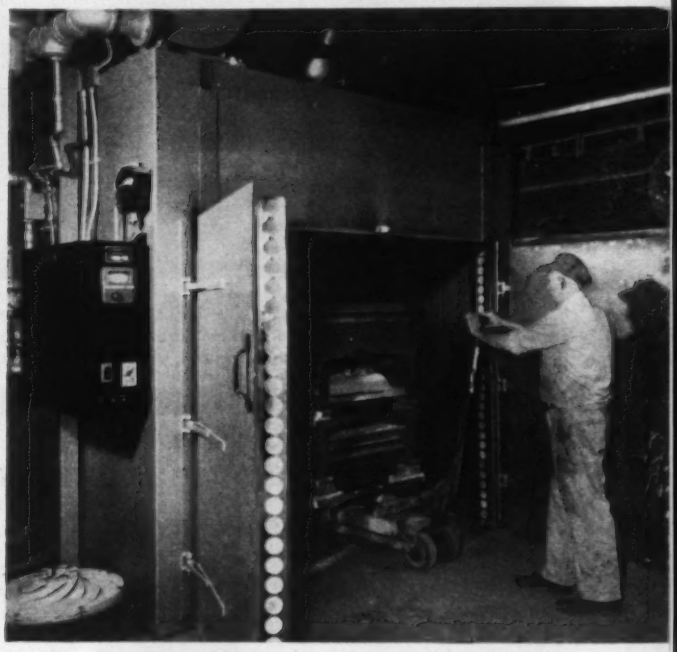
B P C

A Division of Basic Products Corporation

Hevi-Duty Electric Company, Milwaukee 1, Wis.



This Hevi-Duty Oven bakes cores for sand casting brass bushings and gears at Bucyrus-Erie Company, South Milwaukee, Wisconsin. The finished parts will be used in the world's largest power shovel. This oven more than matches the output of the unit it replaced, yet it requires only half the floor space. Further, its temperature uniformity and efficient combustion assure clean cores of excellent quality. ***For complete information on this, write for Bulletin 259.***



Stainless Foundry and Engineering, Inc., Milwaukee, Wisconsin, uses this Hevi-Duty oven for drying molds and cores. It operates 24 hours a day, five days a week at 475° F. Its over-all temperature uniformity, excellent circulation of heated air has doubled capacity of the previous unit. Efficient combustion has also resulted in fuel savings, and contributed to the excellence of the finished castings. ***For complete information on this, write for Bulletin 259.***

A unique system of ducts above and below each belt distributes hot air evenly among these three tiers of paper mache flower pots. This oven also dries packaging materials for a large Midwestern container corporation. Built in standard 20-ft increments, it can be expanded to meet any continuous evaporation process by simply adding new sections. ***Please write for Bulletin 159.***

Here 2100 lb. *LPR's reduced downtime frequency by about 86%; slashed scrap loss proportionately; stepped up production 12 to 15%.
High-density *LPR's cut storage space 50%. By contrast notice sprawling heap of 300 lb. coils in right background. Unloading time reduced 82%.
Photos courtesy The Frank F. Taylor Co. (Taylor-Tot People) Norwood, Cincinnati, Ohio

Brite wire fabricators report these savings from DSC-PORTSMOUTH Long Production Run

*LPR COILS

HIGH-DENSITY *LPR's weighing from about 1200 to 4200 lbs. cost no more than comparable gauge and grade brite wire in traditional 150 to 400 lb. bundles. *But see what they save you in fabricating.*

***LPR's FEED UP TO 28 TIMES MORE WIRE PER SET-UP** —in single-length run—eliminating up to about 95% of production stoppages due to coil changes and set-up adjustments . . . They shrink your downtime, minimize your coil-remnant scrap.

THEY INCREASE YOUR NET OUTPUT per man-hour or per shift; cut your unit fabricating costs; save material. They widen your manufacturing margin, strengthen your competitive position.

WHAT'S MORE . . . high-density packaging (greater weight per cubic foot) conserves your storage space; makes your coil stock more accessible; sharpens your inventory control; cuts your handling time, expense and effort in shifting bundles from unloading platform to stock room—to production floor—to machine. Rids you of bothersome returnable carriers and small coil racks.

THE PROOF? We'll gladly present the details . . . or you can convince yourself by a job-test under your own operating conditions. *We'll help you set the stage* . . . For immediate action call your nearest DSC Customer "Rep" or write: DETROIT STEEL CORPORATION, BOX 7508, DETROIT 9, MICHIGAN.

Customer Satisfaction—Our No. 1 Job

Customer "REP" Offices in Principal Cities

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Performance Proved DSC®

DETROIT STEEL

Flat Rolled and Wire Products

Question from Germany

A visitor from Germany this week shook us up with a blunt question: "Why is your metalworking industry content to be so static?"

Up to then, we took great comfort in the belief that U. S. metalworking technology had made fantastic gains over the past decade. We believed that our production and capacity were expanding satisfactorily—despite some pauses. We believed that our marketing techniques were pretty fair.

But the German's question led us into some statistical comparisons:

Our production of cold rolled steel sheets, a primary raw material for metalworking, gained 37 per cent from 1950 to 1959. Pretty good! But the United Kingdom had a 122 per cent increase, West Germany 1046 per cent, France 1502 per cent, Italy 1705 per cent.

Or take automobiles. The United Kingdom gained 128 per cent in ten years, Italy 172 per cent, France 322 per cent, Germany 357 per cent.

In 1959, U. S. auto output was 16 per cent less than it was in 1950.

True, 1959 was not one of our better years. But allowing for annual fluctuations, the pattern is frighteningly clear. We are being outgrown by other industrialized countries.

Why?

We believe three reasons are paramount.

1. The Europeans and Japanese are spending relatively much more than we are for modern production equipment—two to three times as much in terms of their national product. A survey by this magazine indicates that the U. S. metalworking industry needs more than $20 billion worth of new capital equipment. This year, we will buy less than one-quarter that amount.

2. Europeans and Japanese work harder than their U. S. counterparts. They are more attentive to their equipment. They take greater pride in their product.

The U. S. metalworking industry spends more than ten times as much annually for people power as it does for new production equipment. Our wages and salaries, compared with those in foreign countries, are fantastically high. We ought to get more for our money.

3. Foreign marketing techniques are overtaking ours. Our foreign competitors pay more attention than we do to producing what the customer wants at prices he is willing to pay. Their help to the customer is often more realistic than ours.

We believe the metalworking industry will have to show improvement in those three areas if it is to regain its competitive momentum.

We'd like to make our German friend eat his question.

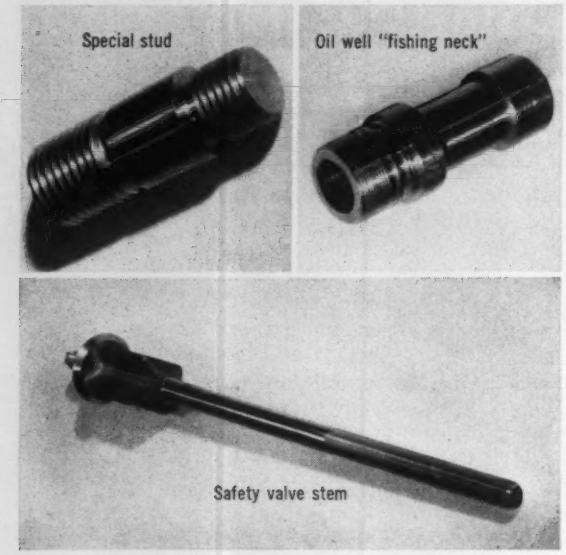
Walter J. Campbell

EDITOR

ARMCO STEELS for better products — lower costs

HOW ARMCO 17-4 PH SOLVE THESE DESIGN AND

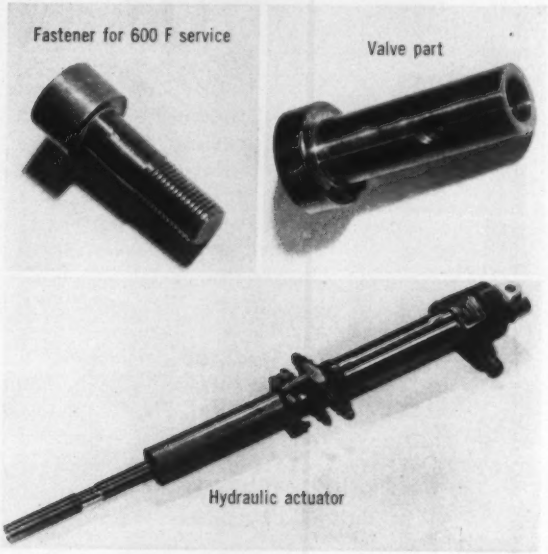
High Strength Plus Corrosion Resistance



Until a relatively few years ago, lack of a stainless steel that combined exceptionally high strength with excellent corrosion resistance forced design compromise. Manufacturers had to accept the limitations of standard stainless grades, plated low-alloy steels or use expensive non-ferrous metals. Then Armco 17-4 PH* Stainless filled this void with typical ultimate tensile strength of 200,000 psi, and corrosion resistance comparable in many media to Type 302 stainless. Manufacturers are now using this unique material for parts such as shafts for pumps, compressors, and specialty motors; studs; fasteners; and valve stems.

*Trademark

Adequate Strength at Elevated Temperatures



Higher operating temperatures and stresses in chemical processing, aircraft, nuclear reactors and other industries create the problem of finding metals with adequate properties. With typical short-time ultimate tensile strengths of 169,000 psi at 700 F, 149,000 psi at 900 F and excellent corrosion resistance, Armco 17-4 PH Stainless Steel has solved this problem in many applications. At temperatures up to 1000 F it has creep, stress-rupture and short-time tensile strengths superior to any of the standard stainless grades. Valve parts, control shafts, fasteners, aircraft components are typical 17-4 PH stainless applications.

Use the unique properties of Armco 17-4 PH Stainless Steel to give **your** products superior performance at low cost. Write us, or mail the coupon, for complete information on this special, easy-to-harden stainless steel. It is available in bars, wire, and billets. Armco Steel Corporation, 2030 Curtis Street, Middletown, Ohio.

New steels are born at Armco

Send me complete information on Armco 17-4 PH Stainless Steel. We are considering it for these applications:_____

Name_____

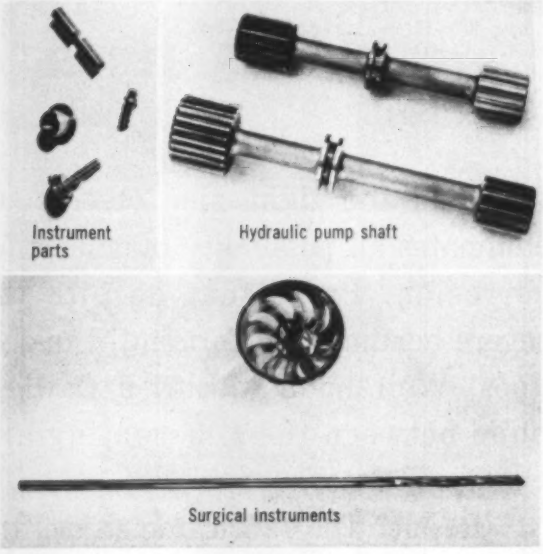
Company_____

Street_____

City_____ Zone____ State_____

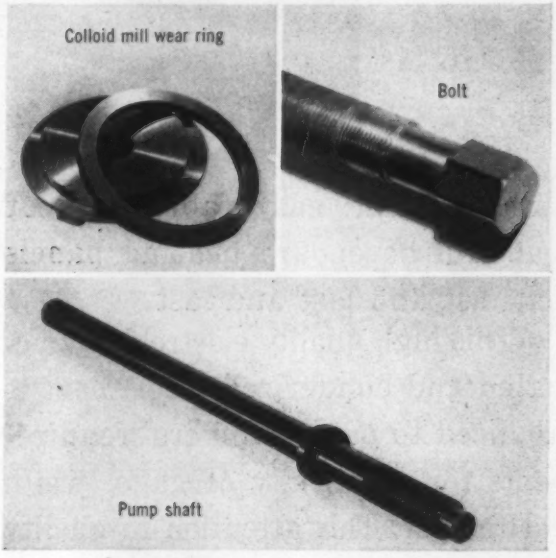
STAINLESS STEEL HELPS PRODUCTION PROBLEMS

Elimination of Distortion and Scaling



Heat treatment of standard hardenable stainless grades and low-alloy steels causes extensive distortion and scaling that requires additional expensive shop operations. Armco 17-4 PH Stainless Steel eliminates all these because it requires only a simple low temperature heat treatment. Hardening at about 900 F for 1 hour or more does away with troublesome distortion and produces only a light heat tint that does not affect dimensional tolerances. Consequently, parts can be completely finished, then heat treated. Tempering, straightening, pickling, and secondary finish machining are eliminated.

Resistance to Galling, Wear and Abrasion

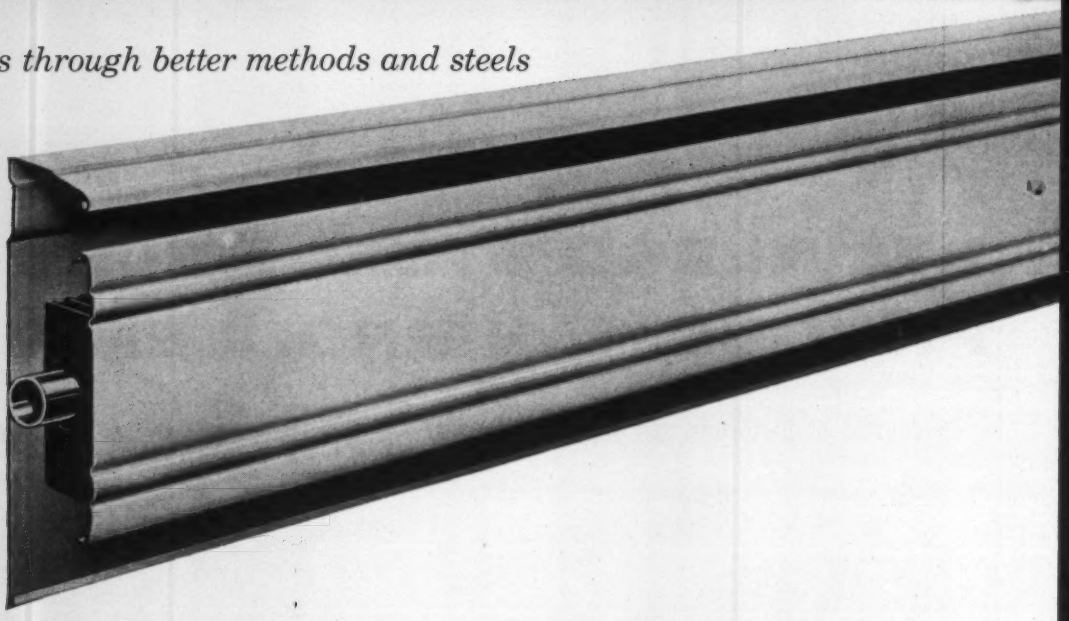


By combining high hardness, up to Rockwell C44, with excellent corrosion resistance, Armco 17-4 PH offers a solution to many galling, wear, and abrasion problems. Formerly, some compromise was necessary because of the limitations of standard stainless grades or expensive high alloy metals used. Now many parts requiring a corrosion resistance approximating that of Type 302 can be given galling and wear resistance that means longer maintenance-free operations. Typical applications where Armco 17-4 PH Stainless results in superior service include studs, pump shafts, valve parts, wear rings and mixer shafts.

ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation

Better products through better methods and steels



With Weirzin: easy fabrication of beautiful baseboard heating panels that last and last and last.

This high quality electrolytic zinc-coated and bonderized steel sheet is produced to our customers' requirements for uniformity of gage, width and temper. This attention to quality along with the excellent corrosion resistance provided by the zinc coating puts Weirzin at the top of its category and around the bottom of an increasingly large number of commercial and residential interiors.

There, these baseboard heating panels provide a functional border of beauty that requires little or no maintenance. The chemically treated surface holds the smoothest of paint jobs and the tight zinc steel bond eliminates all possibility of underfilm corrosion. Proof that despite the severe bending and forming it undergoes, Weirzin maintains a flawless bond between the zinc coating and the steel sheet.

Result? The fabricator enjoys the workability of a fine product and the ultimate consumer benefits from its serviceable beauty. And that's true of any product made from Weirzin.

Strong, smooth Weirzin electrolytic zinc-coated steel is manufactured by Weirton Steel Company. Its high quality is typical of the many other steels produced by Weirton and used throughout industry to improve products, methods and profits.

Steel

Look for the STEELMARK on the products you buy; place it on the products you sell.

WEIRTON STEEL
Weirton, West Virginia

WEIRTON STEEL COMPANY

Weirton Steel is a division of **NATIONAL STEEL CORPORATION**

Nixon Will Give Business Best Boost, Vote Metal Show Goers

1. Will business get better if Nixon is elected President?
   YES 66% NO 34%
2. Will business get better if Kennedy is elected President?
   YES 49% NO 51%
3. Will your company's sales volume be higher in 1961 than in 1960?
   YES 84% NO 16%
4. Will your company's profit margin be better in 1961 than in 1960?
   YES 59% NO 41%
5. Is your company's 1960 profit margin better than it was in 1959?
   YES 50% NO 50%
6. Do you expect your company to raise its prices in the next six months?
   YES 29% NO 71%
7. Is your company losing domestic or overseas business as a result of foreign competition?
   YES 44% NO 56%
8. Will your company increase its spending for capital equipment in 1961 over 1960?
   YES 62% NO 38%

Steel Companies Step Up Their Marketing Pace

METALWORKERS took time out at last week's Metal Show to vote in STEEL's straw poll. Richard M. Nixon won by a wide margin as the better man to lead our economy.

But politics wasn't uppermost in the minds of metalworkers at the 42nd National Metal Exposition & Congress. They were looking for ideas and new information on metals at Philadelphia's Trade & Convention Center.

Engineers and technicians at the 237 exhibits were kept busy answering questions that would help metalworkers meet competition.

• **New Face**—The show had a new personality this year. Companies not directly concerned with metals or their use were not permitted to exhibit—at a cost of $100,000 to the American Society for Metals, sponsor of the show. For the first time in 14 years, steel companies were back into the show in force. The 18 steel company exhibitors placed emphasis on special steels for new markets. They talked about:

- Surface coated steels.
- High strength, low alloy steels.
- Tool and die steel for specialty applications.

- Stainless steels.
- Vacuum melted alloys.

• **Hard Sell**—Said Allan Ray Putnam, managing director of the ASM: "Steel producers are showing that steel does have to be promoted. They are featuring their

experts at booths. Attendees want to talk with these technical people."

Said Walter Crafts, associate director-technology, Union Carbide Metals Co., a division of Union Carbide Corp., and a trustee of ASM: "Specific steel products are being shown; specific applications are being discussed. There's no 'blue sky' or shotgun approach."

Said D. I. Brown, assistant to the president, Washington Steel Corp.: "Steel companies are showing how they can get out and merchandise their product.

"Architects want to use stainless steel, but they have been stymied: They could not get color in stainless steel. We will put anything on stainless steel a customer wants."

National Steel Corp. was another company stressing surface coated steels with aesthetic values. One steel producer noted a new market for coated steels: Summer or lawn type furniture. "Other metals have been found to be too light for summer furniture," he said.

Another steel executive said that steel's primary competition is from other metals. He stressed the importance of steel companies doing a better marketing job, urged they become more customer oriented.

• **Foreign Competition** — Edward G. Budd Jr., president, Budd Co., speaking before the ASM Awards Luncheon, told metalworkers that they "may be losing foreign markets by default. We must face the fact," he said, "that wage differentials between this country and others are something we are going to live with for a long time. Our wage rates are not going to be reduced in the foreseeable future. Organized labor must earn its right to continuing high wages by helping to decrease unit costs. It has an equal responsibility with management to keep our industrial and business community strong and competitive, for the sake of the nation and for the good of its own membership.

"Most important of all today, labor and management must learn to avoid the catastrophe of industry-wide strikes."

• **Other Exhibitors** — Materials, processes, and equipment for production and laboratories were also featured.

Visitors saw several new furnace designs, including one that uses a fluidized sand bed as a heat transfer medium. Or they could watch parts being heated by gas, electrical resistance, induction, or molten salt. Cleaning equipment was also featured.

Advanced processing for ultra-high purity materials was exhibited, along with samples of the almost simon-pure materials. Suppliers of processing materials and equipment showed how they could help users do a better job, cut costs, or both.

Laboratory equipment included new microscopes, polishing devices, and testing and measuring equipment.

Instrumentation was featured in many exhibits. New sensing and measuring devices, and improved controls and methods for producing furnace atmospheres were found in several booths.

Staffing the exhibits (valued at $1.5 million) were nearly 1800 experts.

About 200 of the experts were in the steel arena where steelmakers exhibited. Next year's metal show will be in Detroit's Cobo Hall, Oct. 23-27.

• **Award**—The coveted ASM Gold Medal was awarded to John B. Johnson, former chief scientist, Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. The new president of ASM is Dr. W. A. Pennington, head of metallurgy, University of Maryland.

1961: Year of Big Test For Labor Committees

NEXT YEAR PROMISES to provide the big test for the new look in labor relations. The test: Can labor-management-public committees come up with solutions to issues that could not be settled in labor-management negotiations?

Latest entry: A hot featherbedding dispute in the railroad industry. After a 14 hour bargaining session in Chicago last week, negotiators for the nation's railroads and its operating unions agreed to submit the work rules issue to a Presidential fact finding commission.

• **15 Man Group**—The session was held under the direction of Labor Secretary James Mitchell. The commission, still to be named, will study work rules practices and wage structures in the railroad industry. The group will include five members from the unions, five from the railroads, and five representing the public.

The chairman will be a public representative.

Hearings are expected to get underway between Jan. 1 and Jan. 15, and a final report is due by Dec. 1, 1961. The recommendations of the commission to the President will not be binding on the unions or railroad management "but will have great weight," Mr. Mitchell explained.

• **Nine Man Group**—Another in the series of meetings of the United Steelworkers-Kaiser Steel Corp. Long Range Committee was held in New York last week. Dr. George W. Taylor, chairman, again reported that "progress had been made" toward a method of equitably sharing the company's future progress among employees, shareholders, customers of Kaiser Steel, and the public.

Details of the "progress" haven't been revealed. But reports indicate that several members of the nine man group (three union, three public, three Kaiser Steel) aren't too happy. Basic complaint: Too much wrangling over details, not enough attention to the basic problems.

• **Another Group**—The work rules committee set up by 11 steel firms in last January's steel settlements has also hit a snag. It will not meet its Nov. 30 deadline for making a report.

How Many Needed to Get Job Done?

YOU CAN GET a general indication of how effectively you're using your "people power" from the chart at right.

The figures show the percentage of total employment metalworkers require in each of the major corporate functions. The data were prepared by the American Management Association, which is conducting a study on how U. S. industry is utilizing its manpower.

The variations among companies in similar industries proves that many managements have a tremendous potential for improving efficiency by more effective use of their people. For example, the chart shows this spread in the average for metalworking firms in each function:

Function	High	Low
Manufacturing	65.9%	49.0%
Design, R&D	26.6%	5.6%
Marketing	20.2%	3.5%
Administration	10.8%	8.9%

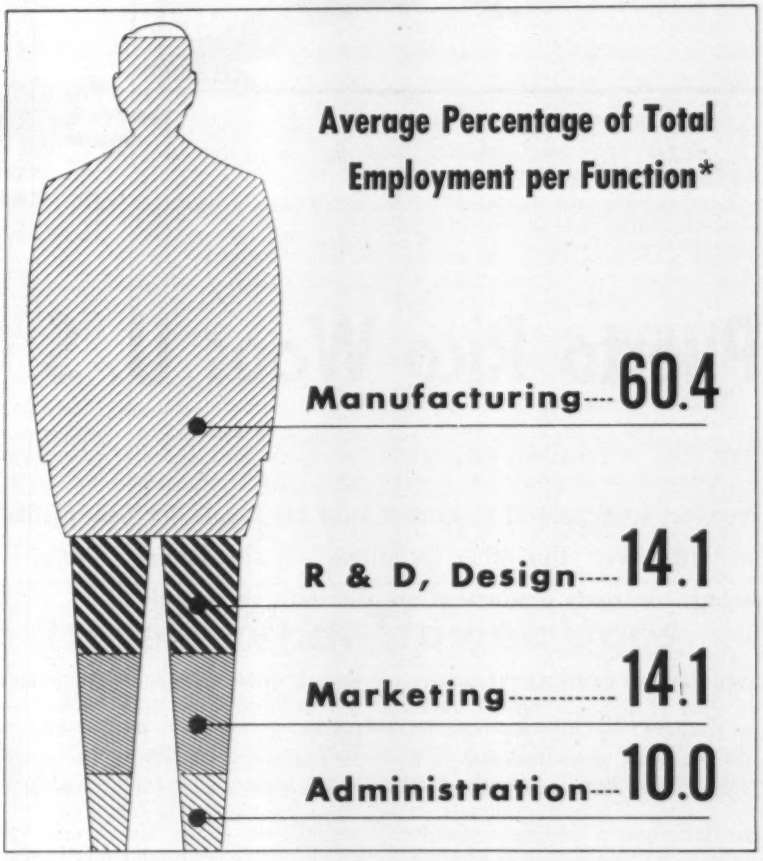
AMA's study included 88 corporations with more than a million employees in these industry groups: Chemicals, drugs, petroleum, rubber, food, paper, textiles, metal fabricating, aircraft, machinery, electronics, and electrical machinery. The chart includes statistics from the last five industry groups only.

Variations of 50 per cent in manpower used to perform standard administrative tasks are common, reports the AMA. In two industry groups, variations of 200 to 500 per cent were discovered in general administrative work.

Economies effected since preliminary figures became available to participating firms range from $36,000 a year for a single operation in one company to more than $1 million in another.

Comparable percentage figures were also developed for subdivisions of the major functions. For example, these subdivision variances were recorded under General Administration:

Subfunction	High	Low
Accounting, auditing	3.7%	2.0%
Personnel	1.9%	0.7%
Purchasing	2.0%	0.5%
Office services	2.1%	0.9%
Operations Improvement	2.3%	0.5%
Tabulating, computing	1.6%	0.5%



*Totals less than 100 per cent because some minor subclassifications were omitted.

Complete data on the study are confidential and available to participating firms only.

The AMA says the project will be continued indefinitely, and additional firms will be added.

"Since participating firms gather data from each of their plants, valuable intracompany comparisons can also be made," says Robert Steadman, AMA vice president-management research, who supervised the project. The project provides one approach to management's biggest problem today—the profits squeeze.

Trade Figures Show Puerto Rican Growth

(Millions of dollars)

	EXPORTS	IMPORTS
1954-55	$353	$575
1955-56	406	633
1956-57	446	710
1957-58	467	728
1958-59	503	807

Puerto Rico Woos U. S. Industry

Freedom from federal taxes and local tax breaks for new plants are attractive. But other incentives are also found. Factories engaged in mass production are the most successful

THE COMMONWEALTH of Puerto Rico is stepping up its efforts to attract U. S. industry. In the last ten years, more than 600 U. S. plants have begun operations on the island. To help accelerate industrialization, a briefing conference on opportunities in Puerto Rico will be held in San Juan, Nov. 30-Dec. 2. It is sponsored by the First National City Bank of New York and the Bureau of National Affairs Inc.

Although Puerto Ricans are U. S. citizens, use U. S. dollars and federal courts, and serve in the U. S. armed forces, they have no vote in Congress. Therefore, neither federal corporate nor personal income taxes apply. The commonwealth has its own fiscal system.

• **Tax Breaks**—Under Puerto Rico's Industrial Incentives Act of 1954, manufacturers that qualify are granted tax exemptions from corporate income tax for the first ten years of operation. During the first seven years, resident managers are exempt from personal income tax on dividends or their share of partnership profits. Property taxes do not apply for five to ten years and neither do other municipal levies for ten years. Manufacturers are allowed excise tax exemptions on raw materials, manufacturing equipment, and machinery used in production. One important qualification: Puerto Rican operations must be branch plants. "Runaways" are not eligible.

• **Growth Has Been Steady**—Puerto Rico has been pulling herself up by her own initiative. The island's gross national product rose from $718 million in 1948-49 to $1.4 billion in 1958-59. Personal income benefited, increasing from $642 million to $1.2 billion during the same period. The commonwealth is now the best per capita overseas customer the U. S. has and seventh in the world on a volume basis. Last year it exported $62 million worth of metal and machine products to the U. S. and $6 million to foreign countries, for a 1000 per cent jump in eight years.

• **Eager Labor Force** — One of Puerto Rico's biggest plus factors is the labor force. The Puerto Rican Employment Service says four to ten prescreened applicants are available for every job. Industrial work is prized and therefore morale is high, absenteeism low. Productivity is 90 to 95 per cent of U. S. standards.

There is a shortage of skilled labor for tool and die makers, setupmen, and skilled mechanics. But the experience of existing companies shows such skills are easily acquired. Top and middle management still come from the mainland, but that situation is slowly being changed as natives gain experience.

Average wages in metalworking are around $1.20 an hour. Latest figures available indicate that fringes (vacations, holidays, sick leave, medical help, and pensions) run between one-quarter and one-third of the U. S. average as a percentage of payroll.

• **Mass Production Best**—The Puerto Rican metalworking industry shows three characteristics: Quantity

production, relatively high labor content, and high value in relation to weight or size. Examples: Electric shavers, photometers, ball bearings, precision springs. The ability of the workers to perform rapid, repetitious, nimble fingered, assembly operations is an important factor in the success of many of those products.

A recent study of 57 plants (average age: 2.6 years) showed sales totaled $15.7 million and yielded a net profit of $1.4 million for a profit to sales return of 8.9 per cent.

• **Good Transportation** — U. S. coastwise shipping laws apply to Puerto Rico. Cargo moving to and from the U. S. must be carried on U. S. flag vessels. U. S.-Puerto Rican trade is served by five steamship companies, three independent carriers, and trailer-ship service. Electrical appliances, equipment, machinery, and materials are generally subject to an ocean freight rate of 69 cents per cubic foot or $1.70 per hundredweight to Atlantic and Gulf ports; 95 cents per cubic foot or $2.28 per hundredweight to Pacific Coast ports. Regular air cargo service is available to many areas of the mainland. Rates to New York range from 10 to 20 cents a pound and from 5 to 10 cents a pound to Miami, Fla. The island has 4283 miles of good roads and modern trucking facilities.

An important development was the U. S. trade zone which opened this year in Mayaguez, port city on the island's West Coast. The zone will make it possible for U. S. metalworkers to bring raw materials into the zone, manufacture them into finished products, and ship them out dutyfree and taxfree to world markets.

• **Assistance Available**—Assistance for firms interested in establishing Puerto Rican operations is readily available from the Puerto Rican Economic Development Administration, which maintains offices in New York, Chicago, Los Angeles, Philadelphia, and Miami.

An EDA agency, the Puerto Rican Industrial Development Co., erects multipurpose structures and plants to specifications. Rentals range from 50 to 95 cents per square foot per year, with leases available for an initial period of ten years.

Trade Association Trains Managers for Members

The Steel Founders' Society of America goes a step beyond providing services commonly expected by its members

EVERY TWO years the society hires a graduate engineer, trains him in steel foundry practices, and releases him to the industry to fill a spot on the managerial level. (The program has been going since 1946; to date, all trainees have come from the Massachusetts Institute of Technology.)

"The training is largely educational," explains Charles Briggs, technical and research director, who supervises the trainees.

• **Ready to Manage**—At the end of two years, the trainee is prepared to be a sales engineer, or assistant to the operating executive, quality control engineer, chief engineer, or metallurgist.

Not to be discounted are the personal contacts which help him in choosing his employer. Demand exceeds supply, and when a trainee becomes available, as many as 25 firms compete for his services.

Usually, says Mr. Briggs, the man's first job pays $8000 to $9000.

"These men are valuable for their broad but exact knowledge," he points out. "The period of training is equivalent to five years' experience in the industry."

Since launching the program, the society has trained seven men. Today, all but one, who left the industry, hold important positions.

Their titles: Sales manager, district sales manager, general superintendent, chief process engineer, assistant to the manager, and assistant to the vice president.

Here Is What Trainee Does...

- Attends regional technical meetings, where he assists the local chairman in planning and administering the session and observes the proceedings.
- Helps edit and prepares outlines of talks given at the society's annual national meeting.
- Works on research projects sponsored by the society, assists in the preparation of reports.
- Participates in preparing and publishing the society's two periodicals—*The Journal of Steel Castings Research* and *Steel Foundry Facts*.
- Keeps up to date on research by closely following the progress of other institutions—Battelle Memorial Institute, Columbus, Ohio, and Case Institute of Technology, Cleveland.
- Visits more than 50 steel foundries, getting firsthand information on the latest operating practices and acquainting himself with other technical and business facets of the industry.
- Reads reference material on all phases of steel casting technology and product development.
- Learns about the industry's markets and competitors.
- Learns to process and prepare information requested by member companies.

Magnesium Mill Products Sales Lag 1959 Pace

MOST FABRICATORS of magnesium mill products say their shipments will be down 10 to 20 per cent this year. The absence of a substantial fourth quarter pickup has virtually killed hopes that 1960 will wind up on a par with 1959.

Industry executives attending the 16th annual convention of the Magnesium Association in Cleveland last week say the downturn in the general economy has cut into orders from civilian users. Spreadouts, cutbacks, and conversions in defense programs have hurt sales to the military—the industry's best customer.

• **Dollars & Prices**—Dollar volume won't drop as much percentagewise as tonnage. Reason: More sophisticated and more complex products are accounting for a bigger share of sales, and the trend will continue. "Unfortunately," says one magnesium man, "many of us are taking in more dollars on each order, but they aren't being reflected in earnings. Vicious price cutting is playing havoc with profits."

"There's just too much capacity for the available business," says another.

• **Primary Shipments Hold**—Through September, primary magnesium shipments totaled 37,755 tons compared with 34,722 tons in the same period last year and 47,532 tons in all of 1959. Even if shipments slump the predicted 20 per cent over the fourth quarter (compared with 1959's), they will still be on a par with last year's.

Primary production will be the highest since 1957. It now looks like the total for 1960 will hit 40,000 to 45,000 tons compared with 31,033 tons last year and 30,096 tons in 1958. The reasons are twofold: 1. Stocks built up in the big production years of 1956 (68,346 tons) and 1957 (81,263 tons) have been pretty well worked off, so that output today is more nearly geared to demand. 2. A second primary producer, Alabama Metallurgical Corp., is now on the scene.

• **Plenty of Supply**—Enough magnesium can be produced to take care of any foreseeable demand. Dow Chemical Co. has a capacity of 85,000 tons a year. That tonnage could almost be doubled by the increasing production automation of present facilities, says Dow.

Secondary producers have a capacity of about 8000 tons a year.

Alabama Metallurgical Corp. has a rated capacity of 6000 tons of primary metal a year and will reach that level in 1961, says A. E. Petermann, president. "We'll be able to supply more metal when it's needed," he adds.

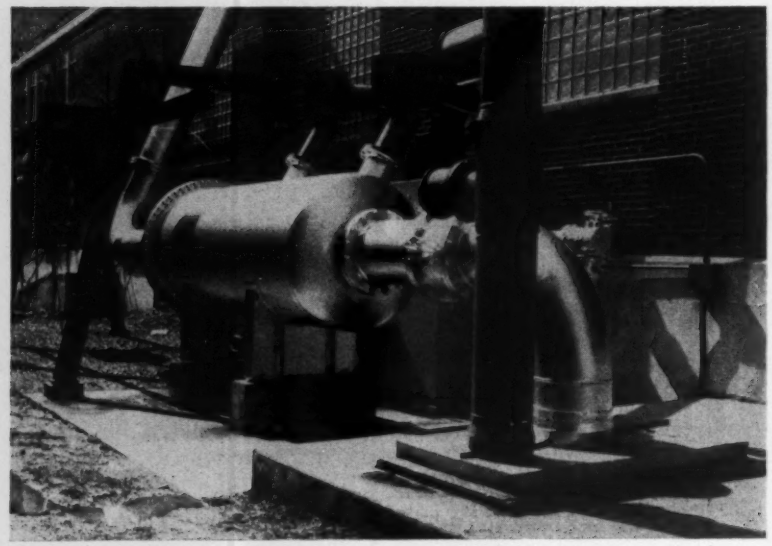
• **Markets**—Magnesium Association members interviewed by STEEL confirm that demand for wrought products is holding up better than it is for castings. Markets like material handling equipment and the graphic arts are running ahead of last year's pace. Usage in missiles and rockets has increased, but magnesium men say orders have been disappointing.

Brooks & Perkins Inc., Detroit, expects orders for spacework to pick up in the next 12 months. "Magnesium will play an increasingly important role in virtually all space projects," says the company.

In cast products, the big future is in diecastings, say magnesium men. "Diecastings require less finishing," points out R. D. Ferguson, general manager of the Bendix Foundries, Bendix Corp., Teterboro, N. J., "and magnesium diecastings weigh less and are competitive in price with aluminum."

Mr. Ferguson sees the business machine field as one of the best civilian markets over the near term.

• **Future**—C. A. Howe, president, Hills-McCanna Co., Chicago, and newly elected president of the Magnesium Association, believes the metal's long range future is tied to wrought product and diecasting applications for the civilian market. "For the immediate future," says Mr. Howe, "cost will hold usage to the military field and to other applications where weight is the governing factor."



THIS ELECTRONIC PRECIPITATOR CLEANS A HURRICANE for the Army at its Aberdeen Proving Grounds, Aberdeen, Md. Built by Western Precipitation Corp., Los Angeles, it removes compressor oil (an explosion hazard) from the air stream in a hypersonic wind tunnel. It is 99 per cent effective while handling 5500 cfm of air at pressures 100 times greater than usual

Aluminum Has New Entry in Can Race

"WE are selling a coated, seamless aluminum can for the same price as a comparable tin can."

That statement was made by John Baugh, sales manager, Central States Can Co., Massillon, Ohio. Occasion: The start of a new, automated canmaking line made by E. W. Bliss Co., Canton, Ohio.

Reasons cited for the competitive price: 1. The cost of raw aluminum stock under the commodity price basing system. 2. Precoated stock eliminates a separate coating operation. 3. The new line bangs out 200 to 240 cans a minute. 4. Only one operator is necessary.

• The key feature of the new line is a draw-redraw method. Kaiser Aluminum & Chemical Corp., Oakland, Calif., helped iron out early production wrinkles.

During the first stage, coated aluminum is blanked and drawn to one-half the final can diameter. The second draw takes place in a special redraw machine; a trim and flanging unit follows. Covers are turned out the normal way. Double seamers provide a tight closure.

• The company plans to penetrate the market for meat packages.

J. R. McCuskey, president of the Massillon firm, points out that aluminum is already handling oil, beer, and frozen citrus juices. His firm's testing program is almost finished (it takes more than a year) on products like potted meats, fish, cheese, and a wide variety of dried products. Within the next year, he claims, most tuna fish packed by West Coast plants will be in aluminum cans.

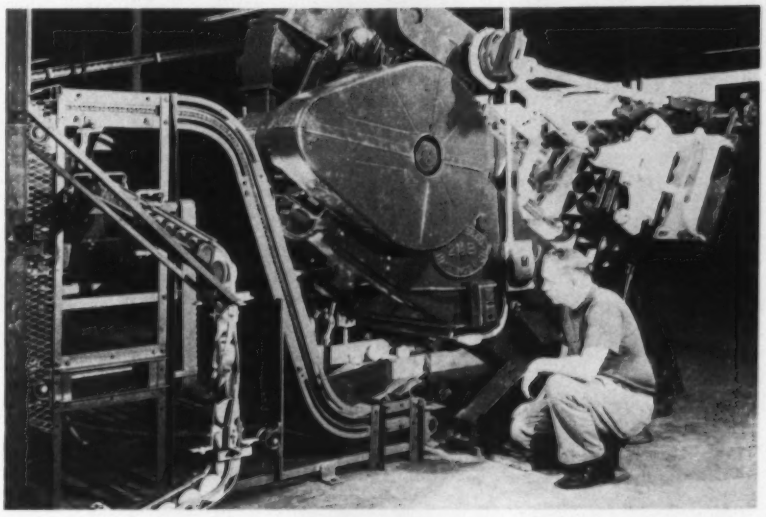
"Don't be surprised if you see wearing apparel in aluminum cans on supermarket shelves. We're working out some final details now," he adds.

• The company also has an "easy-open" top which requires no opener.

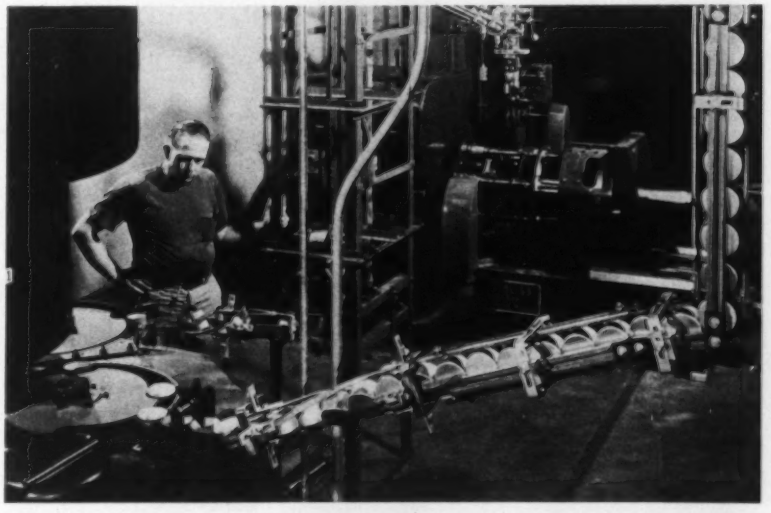
The lid system has a simple tab which tears away a thin strip of metal when pulled. It will be applied only to items which require no internal pressures. Once removed, the lid can be replaced snugly. No sharp edges remain.

The new opening principle may be adapted to round aluminum cans and composites of aluminum and other materials.

Drawn cans, points out Mr. McCuskey, eliminate the problem of side seam leakage—one of the hazards of seamed aluminum cans in the past.

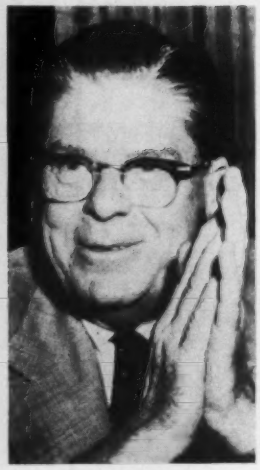


New line employs vinyl-precoated strip to feed this Bliss press which blanks and first draws the seamless can. Conveyor lifts preforms from beneath press to next operation (below)



Preforms are fed through this rotary redraw press designed for the new line. Output goes to a trim and flanging machine and on to packing. One operator can run the line

George Meany, president, AFL-CIO: "Organized labor insists that the burdens of rapid technological change must be cushioned . . ."



James P. Mitchell, secretary of labor: "We are confident no responsible group will urge restriction of technological advances."

Edwin G. Nourse, vice chairman, Joint Council on Economic Education: "The craze for automation might prove a pitfall."

Ralph E. Cross, executive vice president, Cross Co., Detroit: "Automation has, in fact, created thousands of new jobs."

New Congressional Automation Report Tackles Technological Unemployment

A 600 PAGE report by the Congressional Joint Economic Committee's Automation Subcommittee will be the guidebook for legislators facing different demands from unions and business.

Businessmen want better depreciation laws so they can re-equip faster with the latest automated equipment. Unions feel automation must be held in check to avoid high, although admittedly temporary, unemployment.

There's no agreement among the contributors to the report about how to handle automation as a matter of national welfare, but there's little disagreement on two counts: Automation is here to stay, and the nation's economy must grow at a "healthy" rate so the problems generated by automation can be smoothed over.

● AUTOMATION CLAUSES ENDORSED—James P. Mitchell, secretary of labor, reports that "impressive steps" were taken last year to solve the problem of technological unemployment. He cites: Armour & Co. has an agreement with the United Packinghouse Workers to establish management-labor committees to study problems in training, retraining, and relocating workers.

The secretary offers a ten point plan for guidance to labor and management facing technological change. The focus is on the employee: Let him know what's coming, train him for the new machines, retrain those who can't be used, take advantage of normal turnover by not hiring new workers unless they're absolutely needed, give workers plenty of notice of impending layoffs.

● UNIONS CRY TROUBLE—AFL-CIO President George Meany warns that the country has already entered a period of technological unemployment. He admits that radical technological changes will eventually pay off in improved national strength, but he sees a transition period—10 to 20 years of "vast social and economic disruptions." He wants such changes introduced slowly.

The union program for the years ahead: Supplemental unemployment benefits, severance pay, company paid moving expenses, earlier retirement, higher wages, more fringe benefits, and a shorter workweek.

Edwin G. Nourse, once chairman of the Council of Economic Advisers under President Truman, sees a major problem in our inability to train people for the jobs which fall below the level of scientist and engineer but above the level of mechanic or skilled worker. He thinks there is a point at which it is not economical to automate. He warns: "Impressed by the pressure of rising wage rates, management may adopt automation as a way of saving labor and raising unit efficiency, not fully mindful of the burden of overhead costs under conditions of less than full-scale operation."

● FOREIGN COMPETITION—Ralph E. Cross, executive vice president, Cross Co., Detroit, told the same Congressional committee five years ago: "Some companies are building plants in Europe to maintain their share of the European market, but I am convinced that they are looking forward to the time when competition may force them to supply the U. S. market from their European plants."

Mr. Cross does not think high tariffs will help U. S. firms compete with foreign companies for world markets: The U. S. has only one course open to it—higher productivity.

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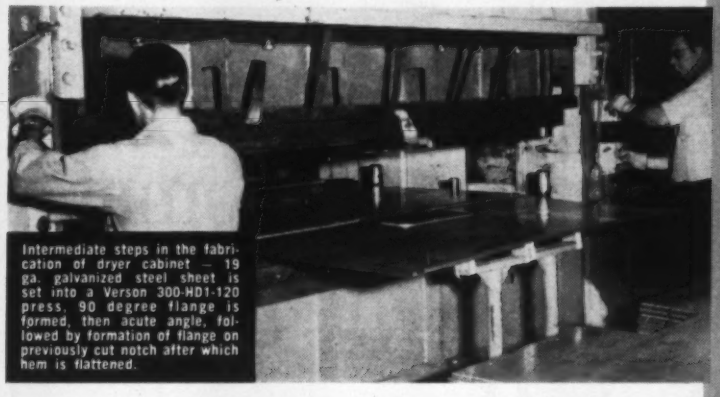
Corrosion Resistance + Formability Make Continuous Galvanized Sheet The *Most Practical Material* For Both Painted and Unpainted Washer and Dryer Parts.

MAYTAG protects product quality and profits by using 15,000 tons of continuously galvanized steel per year for washer and dryer parts.

After extensive tests, Maytag engineers decided that galvanized steel gave them the most practical combination of strength, excellent corrosion resistance and ductility for low cost fabrication. This zinc-coated material is used on both painted and unpainted parts to provide lasting protection against the combined corrosive effects of water, heat, humidity, soaps, detergents, bleaches, abrasion and aeration.



Intermediate steps in the fabrication of dryer cabinet — 19 ga. galvanized steel sheet is set into a Verson 300-HDT-120 press, 90 degree flange is formed, then acute angle, followed by formation of flange on previously cut notch after which hem is flattened.

The tenacious, protective zinc coat remains unimpaired, adhering to the base metal through deep drawing, bending, rolling, seaming, stamping and other operations.

This combination of properties is responsible for the recent development of a wider use of galvanized steel in the automotive industry. Critical corrosion problems in vital parts of the new unitized automotive members have been solved by the use of continuously zinc coated steel.

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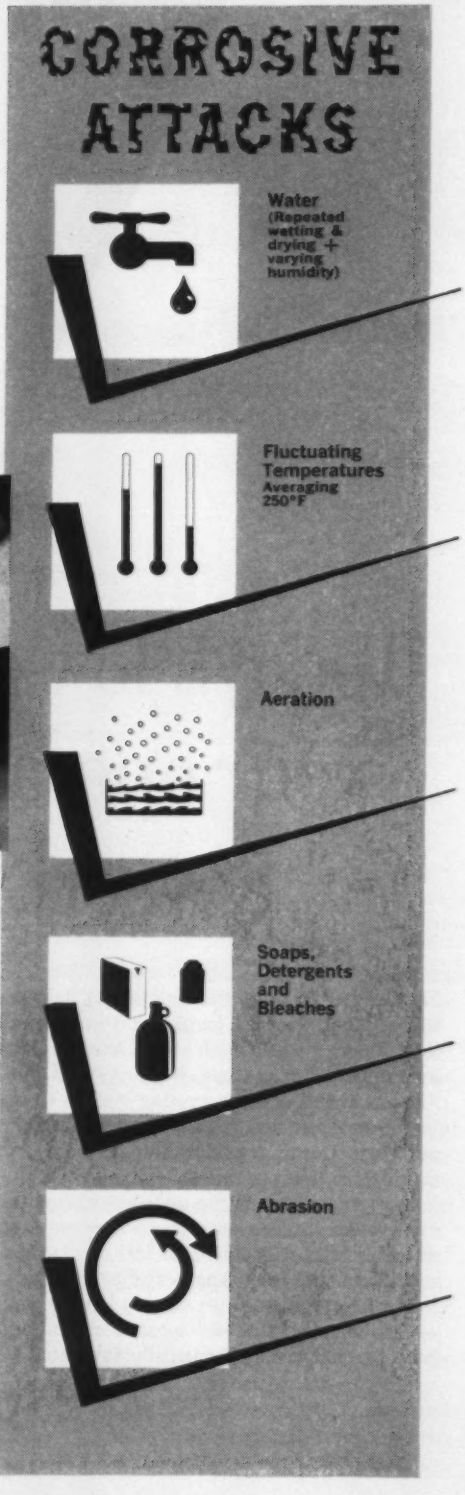

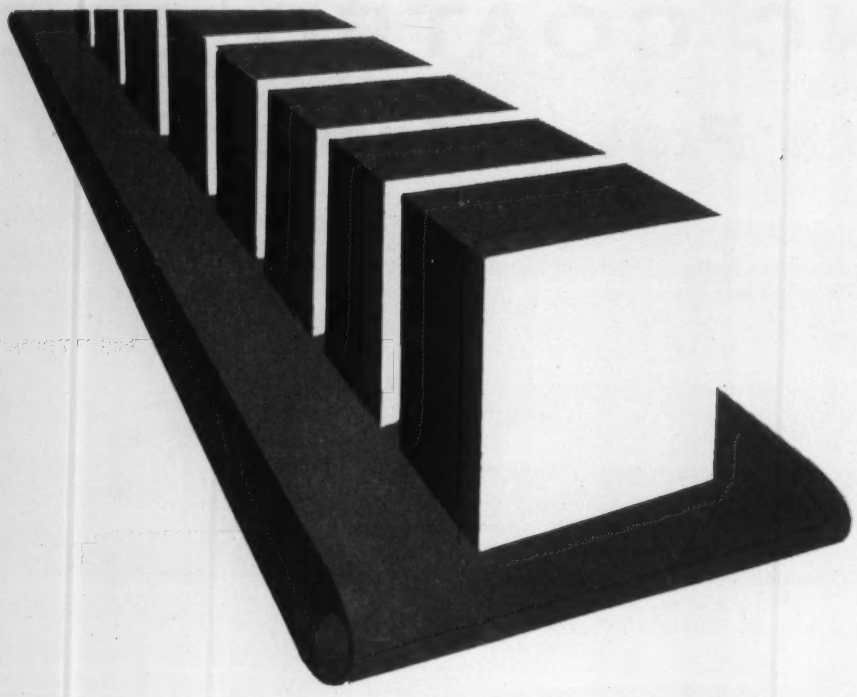

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ROYAL McBEE · *data processing division*

NEW CONCEPTS IN PRACTICAL OFFICE AUTOMATION

MATERIALS EFFICIENCY

How to Build a Materials Team

HAVING 11 STAR PLAYERS doesn't guarantee a winning football team.

Nor do sharp managers insure a profit for your company.

In both cases, another ingredient —teamwork—is needed. And that's a hard-to-get commodity.

Take the case of the purchasing agent who didn't co-ordinate his work with the traffic manager. The PA was buying at the lowest first cost, but the delivered cost—the price that really should be considered—was higher than that from another source of supply.

Or consider the firm that failed to integrate customer service with shipping. "Hot" items weren't always sent out first, and customers were lost.

Or investigate the many cases of failure to co-ordinate purchasing and inventory control. The usual result is costly, unnecessary build-ups, or costly, unnecessary stockouts.

Then there's the traditional purchasing vs. engineering conflict. It was brought to light on a national level when our missile program was plagued by delays and excessive costs because engineers were committing work to subcontractors without sufficient knowledge of good purchasing practice.

Unfortunately, such errors are common in industry today. They stem from lack of teamwork.

What's behind a company's failure to achieve team play?

Usually, it's one or more of these factors: Lack of co-ordination from the top, poor organizational structure, inadequate communication procedures, one party's lack of respect for another, habit, expedience, inherent selfishness, failure to see the whole picture.

How can you get teamwork?

The materials management concept is one approach that has been successful. It represents one, complete, undivided responsibility for providing the materials a company needs, in the right quantity and quality, at minimum cost—which cost should include transportation,

inspection, storage, and delivery to the point of use (see STEEL, July 4, p. 45).

Needed: Integration

"We find an urgent need to integrate the production scheduling, purchasing, inventory control, customer service, and transportation functions under the direction of a single individual, whom we call a materials manager," Marc A. DeFerranti, general manager, Distribution Transformer Dept., General Electric Co., told an American Management Association conference last year. He says the approach "has worked admirably for us, and we strongly recommend it to the attention of other organizations in which company or department general management is unable to give adequate attention to the various materials management functions." He points out that two kinds of integration are needed:

1. "Internal integration is absolutely necessary for the successful operation of the materials management function," says Mr. DeFerranti. Purchasing, for example, must be co-ordinated with traffic to get the most for your money on incoming transportation of material you buy. Some firms now route all their incoming material themselves (rather than having the supplier do it). Reason: To pick the most economical means—for example, combining shipments from separate suppliers.

2. External integration—co-ordination of all materials functions with the needs and activities of other departments—is the other phase. Transportation, for example, must provide packaging designs that will enable production to pack the product in the most modern, economical, and effective manner. Production control must be in constant touch with materials personnel so that the ever varying needs of the customer are satisfied economically and expeditiously. Likewise, materials management must be integrated with engineering, marketing, and finance.

Wanted: Co-ordination

The essence of the materials management concept is to co-ordinate the various materials functions.

One approach: Make one man re-

Purchasing Executive Tells . . .

Why We Need Teamwork to Manage Materials

"Teamwork is essential to get the best over-all results from a good purchasing program, a good inventory control program, a good production control program, a good engineering and development program, and a program dedicated to customers in gearing up to meet their requirements," declares David S. Gibson, vice president-purchases, Worthington Corp., Harrison, N. J.

He says: "Good teamwork permits the purchasing people to buy most economically in catering to the engineering and manufacturing requirements. It will also reduce inventories to an absolute practical minimum . . . most important these times since the cost of money is high, and it is mandatory that we use it wisely."

"Good teamwork also enables purchasing to co-operate with manufacturing in obtaining materials at the right time to maintain production schedules. We cannot afford to hold up shipments to customers due to a delay in obtaining materials," Mr. Gibson says.

To improve teamwork, he suggests: 1. Spelling out each person's job responsibilities and scope of authority. 2. Developing good communications through such vehicles as procedural manuals and conferences. 3. Motivating people by letting them know they are part of the team, giving them proper recognition for results obtained.

Materials Authority Lists Eight Ways that . . .

Management Concept Brings Teamwork

VINCENT deP. GOUBEAU, vice president-materials, Radio Corp. of America, lists eight benefits of the materials management approach—a concept that provides the climate and structure for teamwork:

1. **Improved Communications**—A properly functioning materials management (MM) operation provides the means of co-ordinating the closely related activities of the various materials and functions involved. Ordering in economical quantities requires close liaison between purchasing and production control.
2. **Better Vendor Relations**—MM permits establishment of supplier delivery schedules on the basis of complete and up-to-the-minute knowledge of present and forecast inventory levels and production needs.
3. **Improved Inventory Turnover**—By fostering a close relationship between the buyer (who knows leadtimes and has close contact with suppliers) and production control (which has inventory and production scheduling information), MM can bring about improved inventory turnover.
4. **Less Duplication**—Packaging often overlaps material handling; purchasing, with its follow-up procedures, often duplicates the work of the expediting group. Sometimes, the same record is kept by three persons. MM can eliminate that.
5. **Centralization of Responsibility**—This can lead to a materials team on which each player carries his share of the burden.
6. **Greater Assurance of Availability**—Knowing both venders' capabilities and the company's inventory and production needs, MM can more effectively insure materials availability to production lines—on time, in the right quantity.
7. **Packaging & Handling Savings**—Co-ordinated planning by purchasing, inventory control, warehousing, material handling, and packaging often leads to better package designs and improved handling systems.
8. **Traffic Savings**—Central authority—and the recognition of traffic as an important member of the team—can lead to more economical and safer modes of transportation for all items.

DAVID S. GIBSON

VINCENT deP. GOUBEAU

sponsible for the flow of materials into, through, and out of the plant. The materials manager generally controls these functions: Purchasing, traffic, inventory control, package design, warehousing, and receiving inspection. He may also be charged with production control, customer service, and material handling in the plant.

• **Why Adopt It?**—"If your objectives are to improve communications, shorten leadtimes, make production processes more flexible, and inspire your people to rise above routine approaches to their jobs, then the concept of materials management would appear to be worthy of serious investigation," declares Vincent deP. Goubeau, vice president-materials, Radio Corp. of America, Camden, N. J. He lists eight benefits the materials management approach can achieve (Page 74).

One of the manuals used in a General Electric management development course also makes a strong argument for the materials management concept: "Useful measurements can be made best if all work in a given organization component is grouped into jobs and tasks that are reasonably similar in kind, scope, and objectives. Not only will such work grouping facilitate getting people of the right and compatible talents grouped together, but it will pave the way for measuring their progress and results."

Another advocate: "Placing complete responsibility for all aspects of materials management with a single individual has permitted us to develop a more expeditious and economical system of materials control," F. B. Drake, general purchasing manager, Air Products Inc., Allentown, Pa., says.

• **Not a Panacea**—Adoption of the materials management concept by itself does not insure teamwork (although it does provide a structure within which team play is easier to achieve). As David S. Gibson, vice president-purchases, Worthington Corp., Harrison, N. J., points out: "The materials management concept can only function efficiently if within itself there is manifest good teamwork. The purchasing function is sufficiently important that it requires the full time attention of dedicated purchasing men, and the same applies to inventory control and production control. With proper teamwork, I believe they can work together to advantage."

What Position on the Team?

The materials management concept will work only if the materials team is placed correctly in the overall organizational structure. You must avoid excessive materials influence and excessive production influence. If you don't, you've shattered your chances for teamwork.

Be careful not to place the materials manager in a position to divert responsibility from the production manager.

Control of the manufacturing process is not the job of the materials manager.

Likewise, it is bad policy to place the materials manager under the supervision of production management, experts advise. Too much factory influence can kill off the efficiency of buying practices. Mr. Goubeau points out some of the pitfalls: 1. Purchasing can become so production oriented that it de-emphasizes supplier relations and favors suppliers who give fast delivery at the expense of quality and cost. 2. The make-or-buy decision may be influenced by whether the factory needs work.

Be Market Oriented

Perhaps the best solution to the problem of too much production influence or too much materials influence is to make both functions customer oriented. "Anybody interested in materials flow is—or should be—looking for new ways to shorten the entire production cycle. One goal of business management today is to get closer to the market. We in materials management can contribute significantly . . . if we can shorten the interval between the conception of a new product and customer delivery. A reduction of even one month in the length of the cycle would constitute a tremendous contribution." So says Mr. Goubeau. He believes electronic data processing can help shorten the cycle.

Play by the Rules

Basic to the achievement of team

play: Abide by the "Ten Commandments of Teamwork":

1. All the players must be paid adequately, given necessary fringe benefits.

2. Every player must hold the conviction that he can upgrade himself.

3. Before any new procedure is used, it should be understood and accepted in principle by all the players concerned.

4. The player must be convinced that his opportunity to make the first team is dependent only on what he can do, his willingness to train himself, and business conditions.

5. The team—department, plant, office, company—is a social institution: A two way communications circuit must be functioning soundly at all times.

6. Each player must understand the relationship of his job to that of others.

7. If the man is involved in a new method, he should be brought in on the ground floor, permitted to help shape the method.

8. The coach must know the capabilities of all the players—so he can use them to best advantage.

9. Give each player credit for his contribution.

10. Offer each man an opportunity to train himself for a better position.

Materials Manager Reports . . .

How Bendix Built Teamwork in Materials

BENDIX CORP.'S Kansas City Div. has built teamwork into its materials functions. STEEL asked the division's materials manager, K. A. Cruise, how the goal was reached. His answer:

Not long ago, the average buyer was certain each inspector had a quota—that the inspector would reject a portion of all purchased material to justify his existence. And it seemed obvious to quality control that many suppliers were not selected on the basis of their reliability. Those problems no longer exist. Here's how we solved them:

In many cases, we were aware of the deficiencies in purchased items, but we were tied down because of design specifications. In other cases, we would have been forced to pay substantial tooling costs to switch to a more satisfactory source. In some cases, venders simply could do no better. We recognized a crying need for inspection, quality control, and materials people to understand one another.

So we started a series of weekly meetings. From them came an exchange of trip reports between purchasing and quality control people. Each department found tip-offs in the reports of action that was needed or that had been taken.

Another step: We have regular seminars for supervisors and employees in the various operating divisions. Purchasing arranged to conduct some of the sessions, which led to closer co-operation.

Proof of results: Today, when a quality control man observes a condition in a vender's plant that is dangerous to continued good quality and he is unable to get corrective action, he phones the buyer—who is able to exert his economic pressures to force co-operation.

And buyers are more quality conscious; they don't let rejectable items get into inventory.

Bendix also recognized the need for closer co-operation between engineering and the materials division. Engineering had often negotiated directly with potential suppliers, frequently without purchasing's knowledge. Engineering felt purchasing was not qualified technically to understand its complex problems and that purchasing would not act fast enough. To counter that attitude, we moved a small buying group (with sole purchasing responsibility for the development support, engineering, and model shop activities) into the engineering department—where it was readily accessible to the engineers. We staffed the group with capable buyers, headed by an experienced purchasing supervisor with a degree in electrical engineering. (Incidentally, we have 33 engineers on our 230 man purchasing staff.) We didn't try to prevent engineering contact with venders; in fact, we encouraged it. We just wanted to be in on all such contacts that would result in a purchase or a change in an order. By proving their capability and desire, purchasing won engineering's co-operation. Today, an engineer's requisition often is not written until the buyer tells him what is available. That was unheard of a year ago.

We in materials try to show a genuine interest in the problems of other departments. And we maintain liaison with them. Results are gratifying.

KENNETH A. CRUISE

Materials Efficiency

How to Slash Scrap Costs

That's the article coming up Nov. 7 in STEEL's 1960 Management series. For a free copy of any or all articles in this 13 part program on materials efficiency (which started July 4 and will run every other week for the rest of the year), write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. Also available on the same basis is the companion series on production efficiency which appeared during the first half. Use of material like this may win you $1000. For details, see Pages 5 and 6.

INTERNATIONAL SILVER ANNEALS 35,000 LBS. OF BRASS & CUPRO-NICKEL A DAY

in these Power Convection bases

One man is now as productive as many 2-or-3 man annealing departments, and the tools that make him so valuable are these Surface Power Convection* annealing bases. Along with his production rate of 35,000 lbs. a day, he gets exceptional quality in his finished brass and cupro-nickel coils. Power Convection equipment never lets the temperature vary more than 10°F from top to bottom of a load. While one load is heating or soaking, a second is cooling, and the operator prepares the third load on its tray. A single crane handles all loading and unloading.

All the operator does to start a heating cycle is make a single electrical connection between cover and base. The International Silver Company, Meriden, Connecticut, is one of many manufacturers who are realizing higher earnings from Surface Power Convection equipment. You can be another, simply by calling Surface Combustion, 2385 Dorr Street, Toledo 1, Ohio. In Canada: Surface Industrial Furnaces Ltd., Toronto, Ont.

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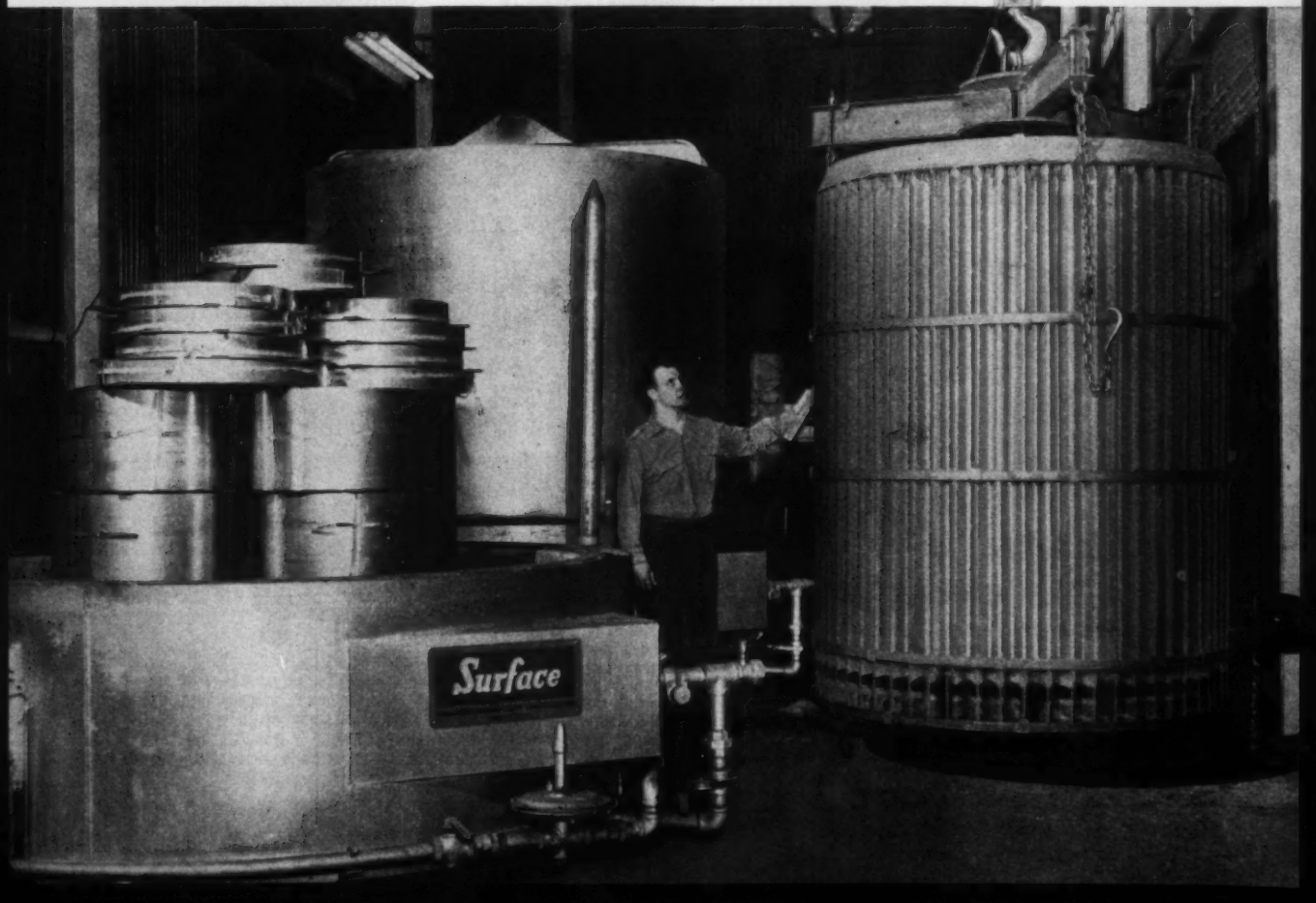

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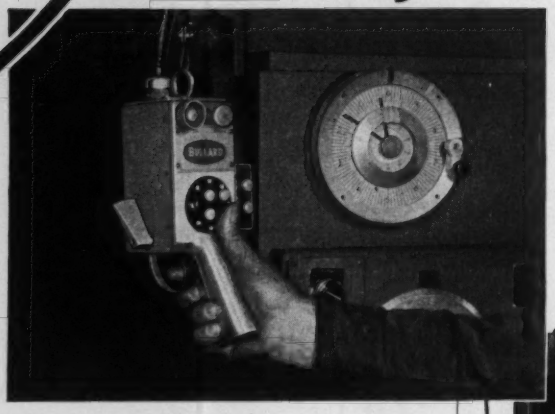

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Dynamill* now brings the work and tool together in the shortest possible time.

These features on the new Bullard Dynamill* H.B.M. provide optimum productivity:

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- **Infinitely variable feed rates which can be changed while the tool is in the cut.**

Simple push button pendant controls and clock-type positioning dials accurately locate head, table, saddle, and spindle.

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POWER CONTROLLED Simple pendant controls start, stop and speed of spindle as well as all directional movements of head, table, saddle and spindle. Large, easy to read clock-type dials show exact position of work in relation to tool. Infinitely variable feed rates and four traverse speed rates. Power Draw Bar for fast and easy tool change. Fully automatic hydraulic binders for head, table and saddle.

VERSATILE Saddle stops allow rapid traversing of saddle to pre-determined positions. Depth-Au-Trol* provides accurate spindle depth Control. Modified Mark 1 Tape Control for head and table positioning. Continuous feed facing attachments with infinitely variable feeds. Right-angle milling, thread cutting and contouring attachments. Built-in or auxiliary tables.

COMPACT AND RUGGED The new Bullard Dynamill* H.B.M. is compact in design — lower in overall height — requiring less floor space, yet has more built-in rigidity and durability.

EASY MAINTENANCE Automatic lubrication throughout — fewer parts — fewer adjustments — easily accessible.

"YOU CAN'T BEAT A BULLARD"

1961—Compacts Extend Price Range

Make	Price	DIMENSIONS† Wheel Base (Inches)	Length (Inches)	Curb Weight (Pounds)	ENGINE* Type	Bhp/rpm	Displacement (Cubic inches)	Comp. Ratio	ACCESSORY PRICES‡ Auto. Trans.	Power Steering	Power Brakes	Radio	Heater & Defroster
CHEVROLET													
Corvair 500	$1974	108	180	2440	6 Al Horiz.	80/4400	145	8:1	$156.60	N/A	N/A	$53.80	$74.25
Biscayne	2316	119	209.3	3655	6-OHV	135/4000	235.5	8.25:1	188.30	$75.35	$43.05	53.80	46.85
Bel Air	2438	119	209.3	3665	V8-OHV	170/4200	283	8.5:1	199.10	75.35	43.05	53.80	46.85
Impala	2590	119	209.3	3670	V8-OHV	170/4200	283	8.5:1	209.85	75.35	43.05	62.45	74.25
Corvette	3934	102	176.7	3035	V8-OHV	230/4800	283	9.5:1	199.10	N/A	N/A	137.35	102.25
PONTIAC													
Tempest	2167	112	189.3	2910	4-OHV	110/4400	195	8.6:1	Prices not released at press time.				
Catalina	2702	119	210	3918	V8-OHV	215/3600	389	8.6:1	231.34	107.50	48.00	89.85	61.50
Venturat	3047	119	210	3999	V8-OHV	215/3600	389	8.6:1	231.34	107.50	48.00	89.85	61.50
Star Chief	3003	123	217	4044	V8-OHV	215/3600	389	8.6:1	231.34	107.50	48.00	124.00	79.25
Bonneville†	3331	123	217	4109	V8-OHV	235/3600	389	8.6:1	231.34	107.50	48.00	124.00	79.25
OLDSMOBILE													
F-85	2384	112	188.2	2695	V8 Al	155/4800	215	8.75:1	189.00	86.08	N/A	65.64	74.24
Dynamic 88	2900	123	212	4186	V8-OHV	250/4400	394	8.75:1	231.34	107.50	43.00	88.77	75.32
Super 88	3176	123	212	4225	V8-OHV	325/4600	394	10:1	231.34	107.50	43.00	88.77	75.32
Series 98	3887	126	218	4370	V8-OHV	325/4600	394	10:1	Std	Std	Std	88.77	75.32
BUICK													
Special	2384	112	188.4	2711	V8 Al	155/4600	215	8.8:1	189.00	86.08	N/A	65.64	74.24
Le Sabre	3107	123	213.2	4302	V8-OHV	250/4400	364	10.25:1	Std	107.50	43.00	90.30	98.90
Invicta†	3515	123	213.2	4351	V8-OHV	325/4400	401	10.25:1	Std	107.50	43.00	90.30	98.90
Electra	3825	126	219.2	4489	V8-OHV	325/4400	401	10.25:1	Std	Std	Std	126.05	98.90
CADILLAC													
Sixty-Two†	5080	129.5	222	4846	V8-OHV	325/4800	390	10.5:1	Std	Std	Std	164.60	128.70
Sixty Special†	6233	129.5	222	4936	V8-OHV	325/4800	390	10.5:1	Std	Std	Std	164.60	128.70
Seventy-Five	9533	149.8	242.3	5556	V8-OHV	325/4800	390	10.5:1	Std	Std	Std	246.60	178.50
FORD													
Falcon	1974	109.5	181.2	2422	6-OHV	85/4200	144	8.7:1	163.10	N/A	N/A	54.05	73.40
Fairlane	2315	119	209.9	3709	6-OHV	135/4000	223	8.4:1	179.80	81.70	43.20	58.50	46.90
Fairlane 500	2546	119	209.9	3809	V8-OHV	175/4200	292	8.8:1	189.60	81.70	43.20	58.50	46.90
Galaxie	2706	119	209.9	3809	V8-OHV	175/4200	292	8.8:1	212.30	81.70	43.20	58.50	75.10
Thunderbird	N/A	113	205	4048	V8-OHV	300/4600	390	9.6:1	Prices not released at press time.				
LINCOLN-MERCURY													
Comet	2053	114	194.8	2539	6-OHV	85/4200	144.3	8.7:1	171.70	N/A	N/A	58.50	74.30
Meteor 600	2471	120	214.6	3780	6-OHV	135/4000	223	8.4:1	179.80	81.70	43.20	65.00	75.10
Meteor 800	2765	120	214.6	3878	V8-OHV	175/4200	292	8.8:1	189.60	81.70	43.20	65.00	75.10
Monterey	2869	120	214.6	3941	V8-OHV	175/4200	292	8.8:1	220.90	81.70	43.20	65.00	75.10
Lincoln Continental	N/A	123	212.4	4954	V8-OHV	300/4100	430	10:1	Prices not released at press time.				
PLYMOUTH													
Valiant V-100	2014	106.5	183.7	2665	6 30 deg.	101/4400	170	8.2:1	171.55	73.00	40.60	58.50	74.40
Savoy	2310	118	209.5	3470	6 30 deg.	145/4000	225	8.2:1	191.80	76.60	42.60	58.50	74.40
Belvedere	2555	118	209.5	3670	V8-OHV	230/4400	318	9:1	210.70	76.60	42.60	58.50	74.40
Fury	2694	118	209.5	3670	V8-OHV	230/4400	318	9:1	210.70	76.60	42.60	58.50	74.40
DODGE													
Lancer 170	2069	106.5	188.8	2665	6 30 deg.	101/4400	170	8.2:1	171.55	73.00	40.60	58.50	74.40
Dart Seneca††	2330	118	209.4	3480	6 30 deg.	145/4000	225	8.2:1	191.80	76.60	42.60	84.25	74.40
Polara	2966	122	212.5	3840	V8-OHV	265/4400	361	9:1	210.70	76.60	42.60	93.65	74.40
DE SOTO†	3167	122	215.8	3970	V8-OHV	265/4400	361	9:1	226.90	106.30	42.60	88.90	97.80
CHRYSLER													
Newport	2964	122	215.6	3710**	V8-OHV	265/4400	361	9:1	226.90	107.60	43.50	99.80	101.90
Windsor	3218	122	215.6	3730	V8-OHV	305/4600	383	10.1:1	226.90	107.60	43.50	124.10	101.90
New Yorker	4123	126	219.8	4055	V8-OHV	350/4600	413	10.1:1	Std	Std	Std	141.40	101.90
IMPERIAL §													
Custom†	5109	129	227.1	4740*	V8-OHV	350/4600	413	10.1:1	Std	Std	Std	153.30	136.30
RAMBLER													
American De Luxe	1894	100	173.1	2650	6-L	90/3800	195.6	8:1	164.85	72.00	39.95	53.95	74.00
American Super	1979	100	173.1	2700	6-OHV	127/4200	195.6	8.7:1	164.85	72.00	39.95	58.50	74.00
Super Classic 8	2397	108	189.8	3360	V8-OHV	200/4900	250	8.7:1	219.50	79.50	41.95	69.95	76.00
Super Ambassador	2537	117	199	3470	V8-OHV	250/4700	327	8.7:1	229.50	89.50	43.95	86.20	82.50
STUDEBAKER													
De Luxe Lark	2005	108.5	175	2805	6-OHV	112/4500	170	8.5:1	164.85	74.50	37.66	56.64	71.00
Regal Lark 8	2290	108.5	175	3116	V8-OHV	180/4500	259.2	8.8:1	199.50	74.50	37.66	60.64	71.00
Lark Cruiser	2458	113	179	3177	V8-OHV	180/4500	259.2	8.8:1	199.50	74.50	37.66	58.89	71.00
Hawk	2650	120.5	204	3357	V8-OHV	210/4500	289	8.8:1	199.50	74.50	37.66	63.82	71.00

†Four door hardtops. Other prices and specifications based on four door sedans. *A variety of engines is shown for each division. Among the different series, most are optional. ††All Darts have same specifications. Dart Pioneer lists at $2459, Phoenix at $2595. §All Imperials have same specifications. Crown Imperial lists at $5647, Le Baron at $6426. ‡Some optional prices are shown on selected series. N/A = Not available. a = Approximate. Prices include federal excise tax and suggested dealer preparation charges. State and local taxes, transportation costs, and accessory prices are not included. **Shipping weights.

(Please turn to Page 80)

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Detroit Auto Show Sets Record

A RECORD quarter million persons jostled into Detroit's Cobo Hall during the first two days of the National Auto Show. Many came to see the giant convention hall itself with 400,000 sq ft of exhibition area, but most were there to look at new cars.

Autodom hopes this display and its attendant national publicity will spark sales. Reports on sales for the first ten days of October showed an 8 per cent increase over a year ago as dealers delivered 156,312 cars. It's still too early to mark this as a trend because 1961 cars have been introduced about a week earlier than last year's models.

Evidence that carbuilders are cautious comes from production planning. Originally, the industry scheduled a 1.9 million car buildup for the last quarter, but it has already started to cut back production which now is figured at 1.5 million, possibly lower. Some 600,000 cars will be turned out this month. In another week, the industry should have a pretty clear idea of which models seem to be the hottest sellers. It then will revise November and December production schedules. Nonetheless, motordom expects a million car inventory on Jan. 1.

Steel companies report they have not yet felt the full impact of 1961 car buildups. Although there are some exceptions, most car divisions have steel enough to virtually carry them through the balance of the year.

Some specific sizes and gages are missing, but automakers apparently feel they can get immediate delivery so there's little point in pushing inventories higher. Judging from purchasing agents' reports, you can figure the carbuilders are carrying better than a 60 day steel inventory right now. It will stretch out even more as production schedules are revised downward.

There's not apt to be much hedge buying against a possible steel price increase either. Automakers sport a relatively low tooling bill on the 1961s (some sources figure it at less than $1 billion). They've cut prices less than 1 per cent on the average. Result: They'll hit standard volume levels (break even plus present profit) earlier in the model run. That will automatically compensate for any additional costs in steel since only materials and direct labor have to be paid on each unit built after standard volume is met. Indirect costs already are amortized.

U. S. Auto Output

Passenger Only

	1960	1959
January	688,731	545,756
February	659,323	478,518
March	654,242	576,080
April	582,909	578,846
May	611,226	546,817
June	613,147	557,995
July	434,377	555,410
August	305,527	239,152
September	407,685	258,151
9 Mo. Totals	4,957,167	4,336,725
October		507,527
November		254,527
December		494,931
Total		5,593,707

Week Ended	1960	1959
Sept. 17	85,879	62,716
Sept. 24	120,722	91,341
Oct. 1	134,118	105,720
Oct. 8	140,832	118,793
Oct. 15	149,150†	133,430
Oct. 22	152,000*	112,488

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

• **Shopper's Guide**—In case you're shopping for a new car, you can check this year's specifications (Page 79) against last year's (STEEL, Nov. 2, 1959, p. 55). Although width and height specifications aren't listed this year, the 1961 cars generally are narrower. Some are a bit higher.

Standard General Motors lines changed little. They're between 56 and 57 in. high and 78 in. wide (exception: Cadillac, 80 in. wide). Corvair remains 51.5 in. high and 67 in. wide. The Buick Special and Oldsmobile's F-85 are 52.5 and 71 in. Pontiac's Tempest is 53.5 and 72.2 in.

Ford Motor Co. has done some shifting. Lincoln Continental is only 53.5 in. high and 79.9 in. wide, but the other standard company products are within fractions of 55 in. in height, 79.9 in. wide. Falcon and Comet are 54.5 in. high and 70.5 in. wide.

Plymouth, Dodge, De Soto, and the lower Chrysler car series range from 54.6 to 55 in. high and from 78.7 to 79.4 in. wide. New Yorkers and Imperials are 56.7 in. high, 81.8 in. wide. Valiant is the same as last year. Lancer is the same height as Valiant but it's 72 in. wide instead of Valiant's 67 in.

Ramblers are virtually unchanged from 1960. Height averages 57 in. and width is about 71 in. Larks are 1 in. lower (56.5 in.). Width is 71.4 in.

Exhaust Notes . . .

• American Motors Corp. announced that Ramblers will be built in Australia beginning in January. A licensee contract has been signed with Australian Motor Industries Ltd., Port Melbourne. Major parts of the cars will be shipped from AMC's Kenosha, Wis., plant. Others will be produced in Australia. The manufacture of parts in Australia will be stepped up eventually, says William Pickett, director of AMC's automotive exports.

• Auto manufacturers are offering 12,000 mile or 12 month warranty policies on their 1961 cars. Chrysler Corp. is the latest to fall into line. Ford Motor Co., General Motors Corp., American Motors Corp., and Studebaker-Packard Corp. have announced similar warranty policies.

• Allied Steel & Conveyors, a division of Sparton Corp., Lansing, Mich., reports it has received orders for three, main line conveyor systems and 23 feeder conveyors from the Automotive Div. of Fiat, Torino, Italy. A second order for an automatic tire mounter has been placed by the Volkswagen assembly plant at Hanover, Germany.

Ed Weiner, president, talks with Ed Lebowitz, right, Chesterfield's superintendent, by one of the firm's three Wean Equipment slitting lines.

Chesterfield Steel relies on speed, accuracy, durability of Wean coil processing lines

Fast delivery—when, where, and how the customer wants it—is the metal warehouse's stock-in-trade. And Ed Weiner, president of Cleveland's Chesterfield Steel Service Co., is proud of the firm's record for on-time, "on-spec" deliveries of strip and sheet steel, nonferrous and coated metals.

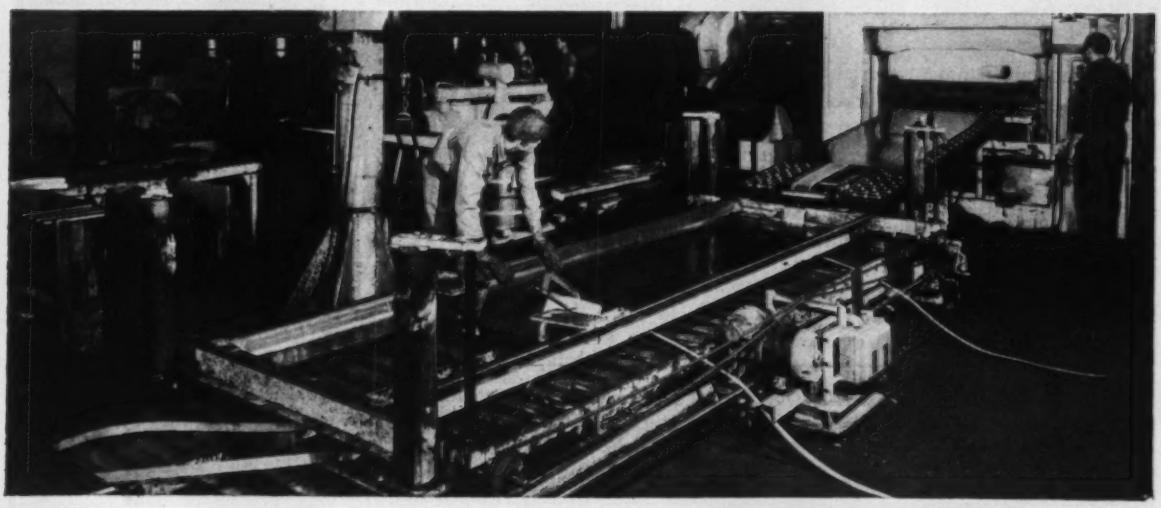
To maintain this reputation for service, Chesterfield needs equipment that will maintain its accuracy under tough, 3-shift, week-long operation. That's why this progressive firm has installed three Wean slitting lines and the 52″ Wean flying shear line shown below . . . and is ordering another flying shear line for 60″ wide strip. Most of the firm's orders for sheet material pass through this coil processing equipment, making both speed and reliability of operation vital. Mr. Weiner notes that the Wean 52″ flying shear line has doubled sheet production over other types of lines previously used by Chesterfield.

Like Chesterfield, Wean has established a reputation as one of the most knowledgeable firms in the field of coil processing and has built equipment that is now serving many of the country's largest metalworking firms. Write for a brochure covering the important savings *you* can realize from coil processing.

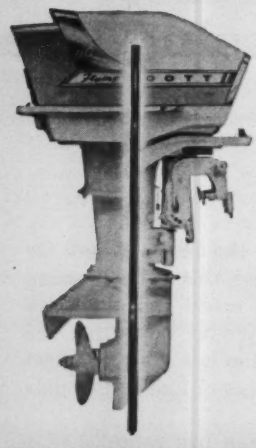
WEAN EQUIPMENT CORPORATION
22800 Lakeland Boulevard
CLEVELAND 17, OHIO

WEAN

Wean flying shear line has elevating run-out conveyor and side guides which adapt to pack height.

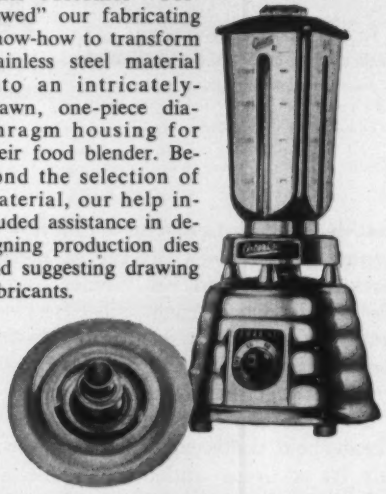


You Can "Borrow" This Helpful Service, Too!



This customer "borrowed" our knowledge of the capabilities of the more than 40 standard grades of stainless steels to come up with the best answer for the drive shaft on their line of outboard motors. They had to have corrosion resistance, superior wear resistance and high strength. They got all three in the new 17-4 PH grade recommended.

This customer "borrowed" our fabricating know-how to transform stainless steel material into an intricately-drawn, one-piece diaphragm housing for their food blender. Beyond the selection of material, our help included assistance in designing production dies and suggesting drawing lubricants.



This customer "borrowed" our experience in stainless tubular products to effect substantial savings in fabrication and assembly of the drop headers in aeration tanks. By combining smooth-flow elbows and continuous sections of stainless steel tubing, they reduced the number of welded joints previously required.

These actual customer experiences give you some idea of the extent to which our metallurgists will go to help you get the most out of stainless steel materials. Keep in mind that this help is available without cost. It's one of the PLUS services you get from the House of Stainless. Whether your needs call for deliveries from our complete stocks or for direct mill shipments from our many mill sources, it will pay you to phone LAfayette 3-7210.

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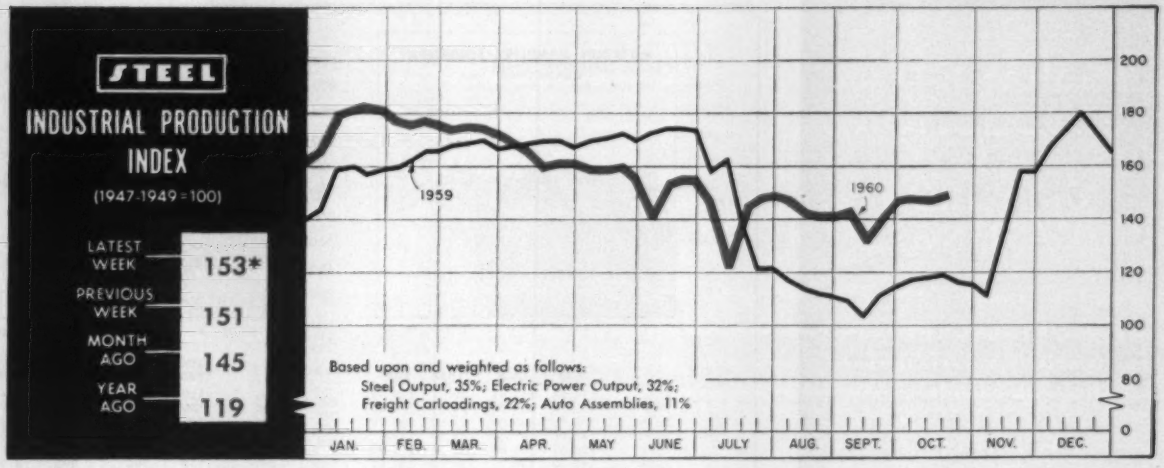

*Week ended Oct. 15.

Optimists Cling to Hope for Upturn

"I CAN'T REMEMBER when opinion has been so divided on the future trend of the economy," declared a veteran economist last week. "For every argument favoring a recession, someone comes up with an equally good argument favoring further expansion."

Statistically, the "recessionists" still have the edge. They were bolstered last week by a further decline in the Federal Reserve Board's industrial production index. At a preliminary 107 per cent of the 1957 base period, the trend line now rests 3.6 per cent below the all-time high set last January. In addition, August was downgraded 1 point (it was originally thought that a decline was resisted during the month). More important is the fact that the weakness is no longer concentrated in the basic metals group but is spread throughout manufacturing.

• **Spurt of Optimism**—Despite persistent deterioration, there is a surprising amount of optimism about the fourth quarter and 1961. Standard & Poor's declares that "a few straws in the wind suggest that there is still the possibility of some improvement in the closing months." Evidence cited: Better than seasonal improvement in miscellaneous loadings of railroad freight cars; a slight improvement in steel orders; an upturn in machine tool orders; the rise in FHA and VA applications for new housing; and improved sales of new and used cars.

S&P looks for gross national product to rise during the next two quarters, dip slightly in the second period of 1961, then rise again throughout the year to a new high of $521 billion. Rising consumer and government expenditures and a favorable balance of trade will offset a decline in private domestic investment.

Both personal income and disposable income will continue rising, except for a barely discernible dip in

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,556[1]	1,579	371
Electric Power Distributed (million kw-hr)	13,600[1]	13,725	12,861
Bituminous Coal Output (1000 tons)	8,125[1]	8,235	7,767
Crude Oil Production (daily avg—1000 bbl)	6,820[1]	6,803	6,839
Construction Volume (*ENR*—millions)	$444.5	$602.8	$266.8
Auto, Truck Output, U. S., Canada (*Ward's*)	173,109[1]	165,030	162,705
TRADE			
Freight Carloadings (1000 Cars)	660[1]	646	581
Intercity Truck Tonnage (changes from year ago)	+0.7%	−1.0%	+6.5%
Business Failures (Dun & Bradstreet)	343	304	274
Currency in Circulation (millions)[3]	$32,276	$32,046	$32,096
Dept. Store Sales (changes from year ago)[3]	+2%	+4%	+3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$22,068	$28,926	$21,001
Federal Gross Debt (billions)	$288.1	$288.1	$287.7
Bond Volume, NYSE (millions)	$21.5	$22.2	$25.3
Stocks Sales, NYSE (thousands of shares)	10,967	12,209	11,543
Loans and Investments (billions)[4]	$105.9	$106.2	$103.0
U. S. Govt. Obligations Held (billions)[4]	$27,694	$27,816	$27,668
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	222.2	227.9	224.8
All Commodities[7]	119.4	119.5	119.2
Commodities Other than Farm & Foods[7]	127.9	128.1	128.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,849,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

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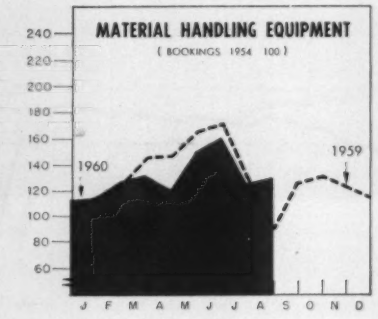
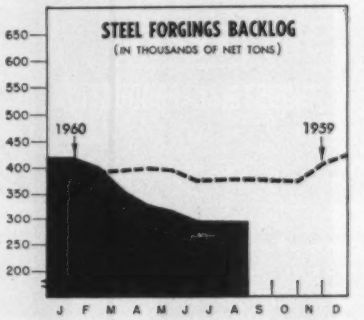
THE BUSINESS TREND



	1960	1959	1958	1957
Jan.	114.96	115.84	93.07	126.34
Feb.	128.74	124.77	93.49	139.29
Mar.	133.60	146.36	97.89	140.76
Apr.	122.41	147.28	122.36	132.67
May	150.33	164.45	118.04	157.95
June	160.23	170.72	131.15	121.57
July	126.79	130.26	134.34	128.31
Aug.	131.33	87.02	104.46	110.09
Sept.	.....	126.43	85.41	116.79
Oct.	.....	131.09	111.35	124.80
Nov.	.....	124.16	110.88	87.80
Dec.	.....	113.78	105.97	105.65
Avg	.....	131.85	109.87	124.34

Material Handling Institute Inc.
Charts copyright, 1960, STEEL.



	Shipments 1960	Shipments 1959	Unfilled Orders 1960	Unfilled Orders 1959
Jan.	123	113	420	353
Feb.	130	113	398	392
Mar.	138	129	356	396
Apr.	117	136	325	398
May	110	142	312	394
June	110	140	295	375
July	79	103	295	377
Aug.	89	98	294	376
Sept.	...	103	...	374
Oct.	...	97	...	373
Nov.	...	87	...	405
Dec.	...	114	...	420

U. S. Bureau of the Census. Data based on reports from commercial and captive forge shops with monthly shipments of 50 tons or more.

the second quarter. The only real evidence of a downturn comes in S&P's forecast of the FRB index, which is scheduled to decline to a low of 99 (1957=100) in 1961's third quarter, followed by a sharp upturn in the fourth.

• **Credit Men Agree**—The National Association of Credit Management is also on record against a recession. It points to record high gross national product, record high employment, firm consumer spending plans, and continued plant and equipment expenditures "at a high, strong support level" for 1961.

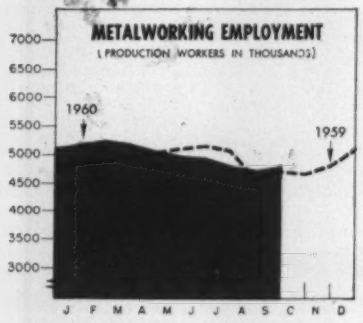
"Just as the majority of economic forecasts at the commencement of the year were too optimistic, so the present estimates may well err on the pessimistic side," the association contends.

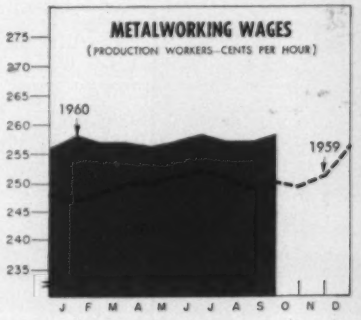
• **So Does Saulnier**—Raymond J. Saulnier, chairman of the President's Council of Economic Advisers, added his weight to the "up" side earlier this month by declaring that "the evidence will not permit a conclusion that we are in a recession." He declared that for the economy to hold at record levels during a year filled with so many unfavorable international developments "is a miracle, and the greatest evidence we could have of the strength and resiliency of our economy." (Mr. Saulnier has been criticized by some for political bias in an election year and defended by others on the basis that he is drawing his conclusions from the same facts available to all economists.)

Pessimism Draws Fire

Roger M. Blough, chairman of U. S. Steel Corp., told a recent meeting of the National Industrial Conference Board that he considers the feeling of pessimism among consumers and businessmen to be "by far the most negative indicator on the business scene, and, in my judgment, perhaps the least justified." He sees the current period as only a pause in "a strong and resilient long run growth trend for the steel industry and industry in general."

The National Association of Credit Management also decries the same state of mind. "Thinking recession might not bring one on, but if enough people think it and talk it up, it certainly does make us readier to accept one if it comes. In this way, it contributes to a deepening of a business dip."





1959	Prim. Mtls.	Fab. Prod.	Mach-inery	Elec. Mchy.	Trans. Equip.
Sept.	611	841	1,167	888	1,200
Oct.	602	812	1,147	893	1,208
Nov.	975	800	1,136	882	1,026
Dec.	1,036	841	1,166	892	1,172
1960					
Jan.	1,048	857	1,179	892	1,239
Feb.	1,052	863	1,191	890	1,245
Mar.	1,043	954	1,186	879	1,221
Apr.	1,020	837	1,176	860	1,187
May	993	836	1,159	855	1,174
June	970	840	1,154	859	1,127
July	924	817	1,130	850	1,105
Aug.	910	822	1,111	860	1,040
Sept.	904	830	1,098	873	1,118

U. S. Bureau of Labor Statistics.

1959	Prim. Mtls.	Fab. Prod.	Mach-inery	Elec. Mchy.	Trans. Equip.
Sept.	266	239	251	223	271
Oct.	265	236	252	224	270
Nov.	278	236	252	224	267
Dec.	285	241	254	227	272
1960					
Jan.	287	245	255	228	276
Feb.	286	243	255	228	274
Mar.	285	243	256	228	273
Apr.	285	242	255	227	271
May	282	245	257	229	273
June	282	245	257	230	274
July	281	245	256	230	274
Aug.	280	246	256	230	275
Sept.	280	245	256	231	280

U. S. Bureau of Labor Statistics.

The NACM doesn't believe that the Presidential election—often blamed for the uncertainty in business—affects the nation's economy. "General business trends are now dominated by economic forces stronger than politics," it declares. "Our history proves that business trends go up or down regardless of political campaigns . . . Our economic strength is not in Washington, or public spending, but in the creativeness of industry and the spirit and confidence of our people."

Contract Awards Gaining

Many of the optimists are counting on construction to lead the economy upward next year, and, so far, contract awards give them plenty of hope. *Engineering News-Record* reports that for the first 41 weeks of 1960, awards are 12 per cent ahead of the 1959 pace. Because of the lag between awards and work put in place, it looks like the first half of next year, at least, will be at a record level.

Both the public and private sectors of construction are in the plus column—public is up 21 per cent, private 3 per cent. The only areas in public construction lagging the year-ago level are sewerage projects, earthwork, dams and waterways, and executive housing. In private awards, only industrial buildings are in the minus column.

Trends Fore and Aft

• New car sales this year may reach 6.6 million to 6.7 million units, says Robert J. Eggert, marketing research manager for Ford Motor Co. That would make 1960 the second best automotive year.

• The growth curve for the comparatively new ultrasonics industry is almost straight up, declares Robert L. Rod, chairman of Acoustica Associates Inc., Los Angeles. "With untapped markets ready for such things as ultrasonic dishwashers and steak tenderizers and with industry crying for better ways of cleaning large things and more accurately gaging fuels, metals, and plastics, there is no end in sight. Ultrasonic cleaning equipment probably accounts for the lion's share of the total nondefense portion of the industry's sales, or about $10 million annually."

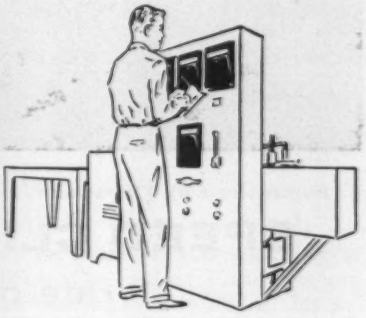
• One of the Big Three auto producers has cut 50,000 completions from its fourth quarter schedules, 15,000 coming out of October's, says *Ward's Automotive Reports*.

W. C. "BILL" PINE, Hayes Chief Metallurgist, reports . . .

BRAZING CALLS FOR KNOW-HOW PLUS SHOW-HOW

Pioneer of controlled atmosphere heat treating, and developer of the *first* electric furnace for stainless steel brazing . . . Hayes today offers you one of the most extensive lines of furnaces and atmosphere generators for all types of metal bonding operations.

Hayes "KNOW-HOW" provides a customized brazing technique which takes into consideration every aspect of the job: Selection of alloys, placing and fixturing of work, choice of atmospheres, proper time-temperature cycles. Whatever the brazing application — from aluminum (900°F range) to platinum (3400°F range) — Hayes "SHOW-HOW" then proves the technique on full production-line equipment in our lab.



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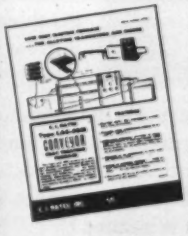

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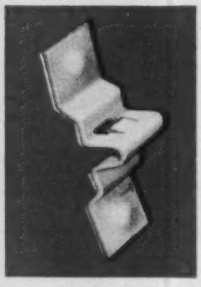
SPEED CLIP® replaces three parts on table-slide ...rate of assembly increased by 50%!



New all-steel nonbinding slides made by Watertown Table-Slide Company are now assembled faster, better! One Tinnerman SPEED CLIP replaces three separate parts used in earlier designs and produces double-header savings for Watertown.

This special spring steel SPEED CLIP holds the slides together firmly, yet lets them slide easily without binding. One quick stroke with an ordinary mallet seats and locks the SPEED CLIP in place. Long service life without loosening or sagging is assured.

Savings and assembly advantages like these are possible on your product too. Call in your Tinnerman representative and let him show you how. He can acquaint you with the 10,000 variations of SPEED NUT Brand Fasteners bringing similar benefits to manufacturers everywhere. He can also arrange for a FASTENING ANALYSIS of your product. This no-charge service has saved industry millions of dollars. Why not see what it can do for you? Tell us when you would like to have him call.

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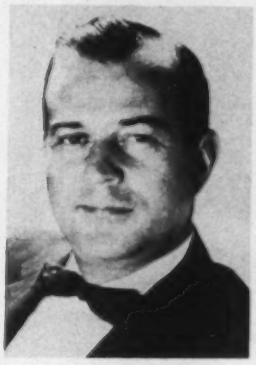
JAMES M. HAIT
Food Machinery president

JOHN D. FANSLER
Wayne Pump sales post



WILLIAM L. DAVIS
Emerson Electric exec. v. p.

E. S. HOOPES JR.
Timken steel-tube gen. mgr.

James M. Hait, former executive vice president in charge of the Ordnance Div. and director of engineering, **Food Machinery & Chemical Corp.,** San Jose, Calif., was elected president.

William P. Panny was appointed vice president of **Pioneer Engineering & Mfg. Co.,** Detroit. He was formerly with Chrysler Corp.

Clifford M. Apgar was named manager of shop operations at **General Electric Co.'s** Specialty Foundry, Schenectady, N. Y. He was works manager and vice president-operations at Adirondack Foundries & Steel Inc.

William F. Martin was made vice president and assistant general manager, **Mechanics Universal Joint Div.,** Borg-Warner Corp., Chicago. He joined B-W's Byron Jackson Div. in 1956 and became vice president-manufacturing. In 1959, he was promoted to director of manufacturing services for B-W.

Carl W. Sisco was made sales manager, steel mill equipment, at Toledo, Ohio, for **Surface Combustion Div.,** Midland-Ross Corp. **Ray E. Kranz** was made Pittsburgh district sales manager of steel mill equipment.

At **Cornell-Dubilier Electronics Div.,** South Plainfield, N. J., Federal Pacific Electric Co., **Glenn E. Ronk** was named general sales director. **Rear Adm. Carl F. Stillman** (USN, ret.) was made administrative assistant to Cornell-Dubilier vice president-marketing.

John D. Fansler was made manager of rotary and industrial pump sales, **Wayne Pump Co.,** division of Symington Wayne Corp. He will operate from the Ft. Wayne, Ind., headquarters of the Industrial Div. He was general sales manager, Indiana Oil Equipment Co.

William L. Davis was elected executive vice president of **Emerson Electric Mfg. Co.,** St. Louis. He will serve as general manager of the Electronics & Avionics Div. He is also responsible for cost control programs, and continues to head corporate engineering and development. He became vice president-corporate engineering in 1956.

Edward J. Caffery was appointed vice president and manager of **Follansbee Metals Corp.,** Rochester, N. Y., subsidiary of Beals, McCarthy & Rogers Inc.

Robert M. Jelinek was appointed purchasing agent of **Ceco Steel Products Corp.,** Chicago.

John J. Amero was appointed chief, in charge of the vitrified bond unit, Research & Development Dept., **Norton Co.,** Worcester, Mass.

C. L. Brisley was made chief industrial engineer; **L. M. Dings Jr.** chief production engineer at West Allis Works, West Allis, Wis., **Allis-Chalmers Mfg. Co.**

Worthington Mixter was elected secretary of **Standard Screw Co.** He remains at the Hartford (Conn.) Machine Screw Co. division, continuing as controller.

Timken Roller Bearing Co., Canton, Ohio, appointed **E. S. Hoopes Jr.** to general manager of steel and tube operations; **H. R. McLaren** general superintendent, steel and tube plants; **R. T. Shipley** superintendent, Canton steel and tube plant.

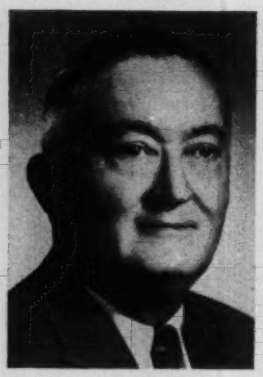
Republic Steel Corp. named **Herman F. Kaiser** divisional superintendent, Massillon, Ohio, steel plant; **Clair W. Leasure** divisional superintendent, Canton, Ohio, steel plant.

Ralph T. Mueller was made assistant to the sales manager, Socket Screw Div., **Bristol Co.** He was Midwest regional manager. He remains in St. Louis.

George A. Klasson was named supervisor, Plasma Flame Cutter Dept., **Thermal Dynamics Corp.,** Lebanon, N. H. He was sales manager for Okiva Inc., Cincinnati, welding equipment distributors.

Robert A. Stewart was appointed product sales manager for electromechanical products of **Veeder-Root Inc.,** Hartford, Conn. He was a specialist in marketing, planning, and promotion for General Electric Co.

Haran W. Bullard, former general superintendent, Ensley Steel Works of U. S. Steel Corp.'s **Tennessee Coal & Iron Div.,** was appointed general superintendent of TC&I's Fairfield, Ala., tin mill. He succeeds **Morris F. Glasscock,** appointed staff engineer in the Metallurgy, Inspection & Research Dept. of



OSCAR AHLERS

ROY HELDENBRAND

vice presidents of Sheffield Corp.

J. JAMES OFFUTT

JACK W. SWATEK

executives of A. P. Green Fire Brick

TC&I. **John J. Shannon** was made general superintendent of the Ensley, Ala., Works.

Oscar Ahlers succeeds **C. Thorpe Thompson**, resigned, as vice president-general manager, **Sheffield Corp.**, Dayton, Ohio, subsidiary of Bendix Corp. **Roy Heldenbrand** succeeds **Louis Polk Jr.**, resigned, as vice president-operations, effective Nov. 1. Mr. Heldenbrand was president and general manager of a Sheffield subsidiary, Threadwell Tap & Die Co.

Telecomputing Corp., Los Angeles, appointed **Frank Kress** to the new post of Eastern regional sales manager for its Data Instruments Div. He will work out of the Silver Spring, Md., office.

Joseph H. McGraw was appointed Eastern district manager of **Vanadium Corp. of America**, New York. **George H. Abel** was made district representative, Eastern district. Mr. McGraw is replaced by **Daniel A. Hackett** as assistant district manager in Detroit.

Gustaf R. Peterson joined the sales staff of **AA Gage Co.**, Detroit. He will co-ordinate design and manufacturing departments with customer needs and schedules. Mr. Peterson was with Swedish Gage Co.

Franklin L. Bateman was appointed general manager of **Spanmaster Crane Div.**, Jervis B. Webb Co., Detroit.

James B. Anderson was appointed manager of Kendex tooling sales for **Kennametal Inc.** He has headquarters in Willoughby, Ohio.

J. James Offutt was appointed vice president-general manager, **A. P. Green Fire Brick Co.**, Mexico, Mo. **Jack W. Swatek** was made director of sales. **H. L. Beynon** was made general sales manager; **W. Ferris Mundy** plant manager of the Mexico operation; and **W. D. Clark** manager of all Green company plants outside of Mexico.

Robert S. Lehleitner was appointed sales manager, Controls Div., **Jackes-Evans Mfg. Co.**, St. Louis. He was field sales engineer for the division.

Donald A. Anderson was made New York district sales manager of **Duff-Norton Co.'s** Jack Div. and Coffing Hoist Div.

Roy E. Lambert was appointed assistant general manager of **Link-Belt Co.'s** ball and roller bearing plant in Indianapolis.

James E. Boyce joined **Kaiser Engineers International** and was elected a vice president. He is based at Kaiser Center, Oakland, Calif., and is responsible for engineering and construction activities in Europe, Africa, and the Middle East.

Hill-Chase & Co. Inc., Philadelphia, named **J. B. Owen** manager, sheet and strip sales.

F. W. Baker Jr. was appointed plant superintendent, **Bird Machine Co.**, South Walpole, Mass. He succeeds **Jim Lindsay**, retired. **Warren P. Sampson** was made assistant plant superintendent.

Francis W. Theis was elected president and chief executive officer of **Pittsburgh Plate Glass Co. International**, S.A. He succeeds **Dwight R. Means**, retired. **Bjorn Holmstrom** succeeds **Edwin T. Asplundh** as chairman.

Neville W. James joined **International Resistance Co.** at Philadelphia as reliability-quality control engineer.

Edward L. Novak was made sales manager, **Newark Steel Drum Co. Inc.**, Linden, N. J. He was with Rheem Mfg. Co.

William O. Hall was made chief engineer, **C. A. Norgren Co.**, Englewood, Colo.

Jack Thomas was appointed sales manager, **Ridley Co.**, Los Angeles. He has served the company in manufacturing and purchasing posts.

Robert E. Deal was appointed general sales manager, **James R. Kearney Corp.**, St. Louis.

Roy J. Wagner joined Telecontrol Div., **Hancock Industries Inc.**, Jackson, Mich., as district manager of the Northeastern Seaboard.

Vernon G. Kneeskern, former plant manager of **Reynolds Metals Co.'s** St. Lawrence Aluminum reduction plant at Massena, N. Y., moves headquarters to the reduction plant at Troutdale, Oreg., as assistant general manager, Reduction Div. He has general responsibility for operation of both the Massena and Troutdale facilities.

Metalized Ceramics Corp., Providence, R. I., appointed **L. J. Lynas**

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CHARLES C. SNIDER
Consolidated Electro. v. p.

E. J. BAUMRUCKER
Clearing v. p.-domestic sales

GEORGE B. McMEANS
Kaiser Industries v. p.

JOSEPH P. FOLEY
Van Norman marketing post

R. E. WOODCOCK
manager of Dana Corp. div.

W. A. OGLETREE
joins Computer Systems

vice president-research and production.

Joseph P. Foley was named marketing manager, Electronics Div., **Van Norman Industries Inc.**, Manchester, N. H. He was with the Electronics Div. of Baldwin-Lima-Hamilton Corp.

R. E. Woodcock was named manager of **Dana Corp.'s** Ft. Wayne, Ind., Div. He has been manager of the Marion, Ind., Div. since 1956.

Charles R. Weaver was appointed a vice president, Automotive Div., **Studebaker-Packard Corp.**, South Bend, Ind. He retains his post as Export Div. general manager. **Roy B. Bender** also was appointed a vice president, Automotive Div., retaining his post as parts and service division manager.

Peter Colefax, president of **American Potash & Chemical Corp.**, Los Angeles, was named to fill the position of chairman, continuing as president.

W. A. Ogletree joined **Computer Systems Inc.**, Monmouth Junction, N. J., as general manager. He was engineering manager, Military Electronic Computer Div., Burroughs Corp.

National Steel Corp., Pittsburgh, promoted **Alvah S. Bunday** to assistant vice president-sales, central division offices, with general supervision of the Chicago, Cincinnati, Grand Rapids, Mich., Indianapolis, Milwaukee, and St. Louis district sales offices. **Albert W. Pettit** was promoted to general sales manager of **Weirton Steel Co.**, Weirton, W. Va., a division. **Oscar V. Johnston** was made general sales manager, **Midwest Steel Corp.**, National Steel's newest division. **A. Dean Peirce** succeeds Mr. Johnston as sales manager, coated steel products, Weirton Steel. **Forrest B. Hutton** succeeds Mr. Pettitt as Cleveland district sales manager, National Steel.

Dr. Marvin W. Sage was named technical director of **Hodag Chemical Corp.**, Skokie, Ill.

Charles C. Snider was elected a vice president of **Consolidated Electrodynamics Corp.**, Pasadena, Calif., subsidiary of Bell & Howell Co. He will direct international operations.

E. P. Cunningham was appointed senior vice president-director international operations at **Clearing Div.**, Chicago, U. S. Industries Inc. **E. J. Baumrucker**, former general sales manager, succeeds Mr. Cunningham as vice president-domestic sales.

George B. McMeans, vice president of Kaiser Steel Corp., was assigned a new executive post as vice president of **Kaiser Industries Corp.**, Oakland, Calif., and of **Henry J. Kaiser Co.** He will report to **Edgar F. Kaiser** (president) and **E. E. Trefethen Jr.** (executive vice president) on development of national and international projects relating to the steel industry and including special projects for Kaiser Steel Corp.

Kurt F. Vogt fills the new post of vice president-marketing for **Acoustica Associates Inc.**, Plainview, N. Y. He joined Acoustica in 1959.

Charles E. Heilig Jr. was appointed sales manager, **American Sealants Co.**, Hartford, Conn. He was recently named general sales manager, Industrial Group, at United Shoe Machinery Corp., after having served as sales manager of its Pop Rivet Div.

Arthur R. Nash was made production programing and control manager for **Ford Motor Co.'s** Engine & Foundry Div., Dearborn, Mich. He succeeds **Ben V. Eastman**, retired.

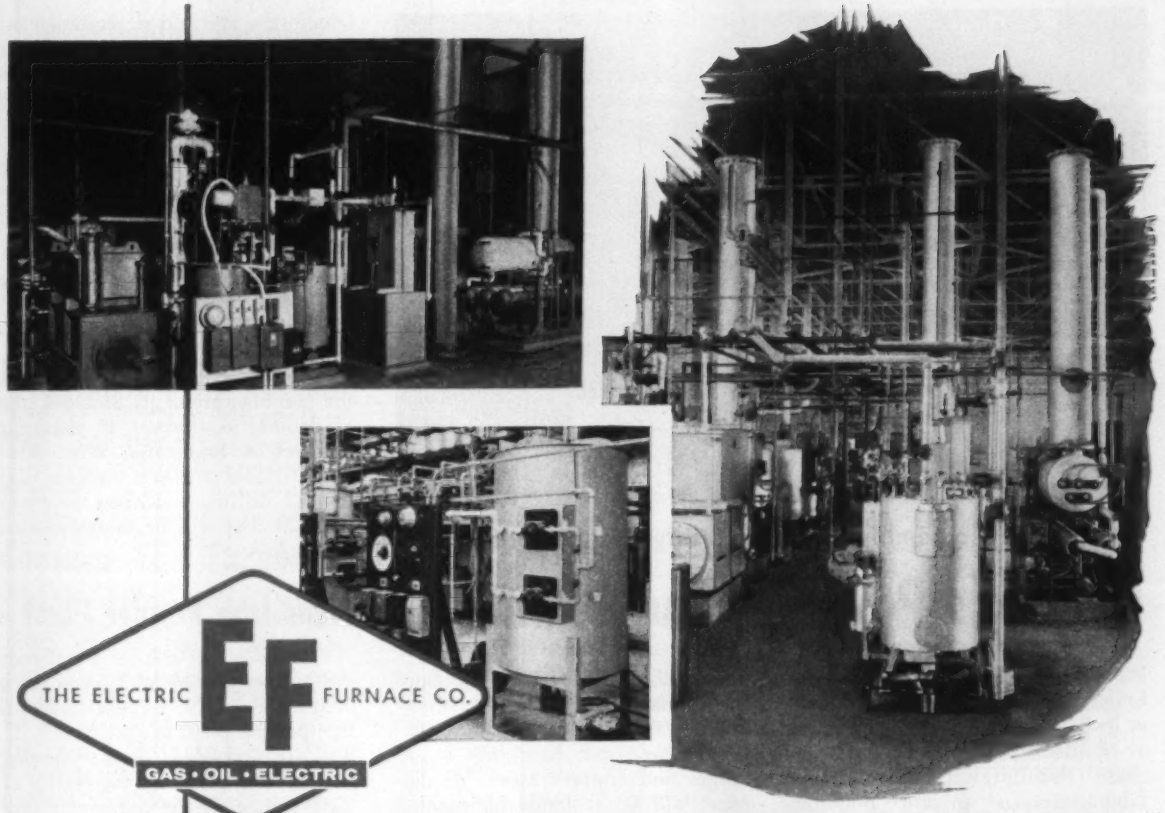
OBITUARIES...

Joseph F. Schaffhausen, 52, president, **Martin Steel Corp.**, Mansfield, Ohio, died Oct. 7.

Edward P. Escher, 68, vice president-sales and engineering, **Screw Conveyor Corp.**, Hammond, Ind., died Oct. 10.

G. E. Walk, sales manager, Dynamatic Div., **Eaton Mfg. Co.**, Kenosha, Wis., died Oct. 10.

Wesley R. Gilbert, 63, chief engineer, **C. I. Hayes Inc.**, Cranston, R. I., died Sept. 29.



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Our equipment is skillfully designed and ruggedly built for long, dependable operation. Completely automatic. Proven in hundreds of exacting installations. Sizes for any hourly capacity.

Ask us also about our wide experience in designing and building roller hearth, wire mesh belt, car bottom, roller rail, catenary, bulkhead tray, walking beam, bell, pit, rotary, screw and other types of furnaces for annealing, normalizing, galvanizing, coating, carburizing, brazing, sintering, billet heating, malleablizing and other heat treatments.

For special atmosphere generating equipment, and continuous or batch furnaces for heat treating any ferrous or non-ferrous material, you'll find "It pays to call the EF heat treating engineers". Let us work with *you* on *your* next project!

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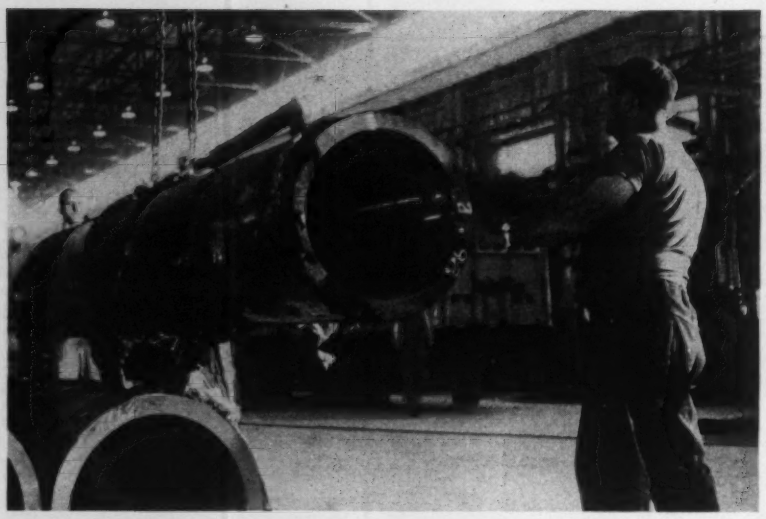


Stainless steel assembly moves on production line basis in . . .

Kellogg's Power Piping Plant

POWER PIPING DIV., M. W. Kellogg Co., has started operations at its $4 million, power piping plant at Williamsport, Pa. Facilities include metallurgical and welding laboratories and an office building, which is the new headquarters of the division. Sales offices remain at 711 Third Ave., New York, N. Y.

John M. McAneny, general manager of the division, says the plant "has been designed for efficient manufacture of power piping systems. It provides our clients in the electric, nuclear power, and process industries with . . . piping systems . . . for their high temperature, high pressure requirements."

• **Production Line**—In the 900 by 155 ft manufacturing plant, the layout is functional. Fittings, pipe, and other materials are stored in a raw materials bay (40 ft wide) which extends the full length of the plant. The materials are fed into the production line. Raw material starts at one end of the plant and moves to the other in a straight line operation, reducing material handling time and eliminating waste motion. Manufacturing stations along the work flow include cutting, bending, machining, welding, heat treating, radiographic inspection, and shipping.

• **Laboratory Facilities** — Equipment in the metallurgical laboratory enables Kellogg, a subsidiary of Pullman Inc., to do mechanical and physical testing (such as tensile, impact, and hardness) at all ranges and temperatures. Equipment will be available for making microscopic studies, supplemented by metallographic equipment for making records. Much of the effort in the welding laboratory will be devoted to the development of automatic procedures for pipe welding.

Reynolds Expands Plant

Reynolds Metals Co., Richmond, Va., is expanding its aluminum reduction plant at Longview, Wash., to make room for facilities for production of extrusion ingots, other improved ingot products, and bar stock for making aluminum conductor wire. The $600,000 expansion provides for an additional 13,000 sq ft of floor space and is scheduled to be completed in about six months. New equipment will include three holding furnaces for processing of the metal prior to casting ingots, a horizontal casting machine, sawing equipment, and homogenizing furnaces.

Sales Department Formed

MB Electronics Div., Textron Electronics Inc., New Haven, Conn., formed a Military Sales Dept. to handle the specialized requirements of government agencies purchasing complex electronic power systems and related equipment. Warren A. Ellsworth Jr. is manager of the new unit.

Transfers Bickford Div.

Cincinnati Milling Machine Co. has officially taken possession of the real estate of the former Cincinnati Bickford Div. of Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. The latter firm has moved the manufacture of its Bickford line of drilling equipment to enlarged quarters in Kaukauna, Wis. Five new Bickford products increase that line of drilling machines to more than 20 that will be manufactured in Kaukauna.

Plans Iron Powder Plant

Pyron Co., a unit of the Amco Div., American Metal Climax Inc., Niagara Falls, N. Y., will build an iron powder plant in that city. A. E. Beck Jr., president, says "completion of this plant in the spring of 1961 will triple the company's production capacity and bring to about $3 million the total investment by Amax during the last 12 months in iron powder facilities."

Apex Smelting Builds

Apex Smelting Co., Chicago, has completed a 27,000 sq ft addition to its plant in that city to house aluminum scrap handling and processing equipment. The firm is a smelter of aluminum alloys and a supplier of magnesium and zinc alloys.

New Names Announced

Superior Steel Products Corp., Milwaukee, changed its name to Superior Die Set Corp. and will operate its newly opened plant at Cheshire, Conn., as its Eastern Div.

Minneapolis - Honeywell Regulator Co., Minneapolis, changed the name of its Datamatic Div. to Electronic Data Processing Div.

Ellisco Inc. is the new name for George D. Ellis & Sons Inc., Philadelphia, producer of metal cans and metal specialties. The firm's Myers Mfg. Div. operates a plant in Camden, N. J.

IBM Enlarging Facilities

International Business Machines Corp., New York, plans to build a 150,000 sq ft product development laboratory at Poughkeepsie, N. Y. Construction will be started in November. Completion is expected late in 1961. The firm is constructing a 225,000 sq ft Materials Distribution Center at the Poughkeepsie plant and a 181,500 sq ft addition to its main laboratory at Endicott, N. Y. A 250,000 sq ft office building will be constructed at Armonk, N. Y., for its General Products and Data Systems Divisions. The four projects will add more than 800,000 sq ft to the firm's facilities.

Conveyor Firm Expanding

Jorgensen Conveyors Inc., Milwaukee, purchased the 15,000 sq ft plant of Burnham Pattern Inc. in Brookfield, Wis. As part of its expansion program, Jorgensen will double the size of the newly acquired plant, will build a 55,000 sq ft plant, and is seeking 10,000 sq ft of additional space for production of conveyor chain.

Offers Antismog Mufflers

Oxy-Catalyst Inc., Berwyn, Pa., has organized a subsidiary, E. J. Houdry Muffler Co., to equip motor vehicles with catalytic exhaust purifying devices which are required by law in California. G. P. Larson is president of the new company.

Gets Brazilian Mill Order

Companhia Siderurgica Paulista, Sao Paulo, Brazil, has ordered a cold rolling mill from E. W. Bliss Co.'s Rolling Mill Div., Salem, Ohio. The facility is part of a new, fully integrated, steel mill which will help fill the increased needs of the expanding Brazilian automotive industry for high quality, locally made, sheet steel.

The equipment will be built partly by Bliss's West German subsidiary, E. W. Bliss-Henschel G.m.b.H. of Duesseldorf, and partly under a special manufacturing agreement by Schneider Creusot, Paris, France. Bliss-Henschel equipment will include a 66 in. skin pass mill, manufactured by Henschel-Works, G.m.b.H., Kassel, West Germany, which shares an interest in Bliss-Henschel. Schneider Creusot is building a three stand, four high, tandem cold mill and a four high, temper mill, both 66 in. wide.

Kaiser Engineers is acting as general consultant to the Brazilian firm.

NEW PLANTS

Latrobe Steel Co., Latrobe, Pa., opened a steel service center at 100 Walbridge N.W., Grand Rapids, Mich., which will carry stocks of tool, die, and specialty steels. P. E. Fedeles is the sales engineer.

Consolidated Western Steel Div., U. S. Steel Corp., is erecting a plant in West Phoenix, Ariz. The division provides services for the design, engineering, fabrication, and erection of a wide range of projects from plates, sheets, and light structural steel. The plant will consist of four major production buildings, an office building, and four service buildings. The project is scheduled to be completed early next year.

Commonwealth Edison Co. dedicated its $51 million nuclear power station at Dresden, Ill. Capacity: 180,000 kw—enough to serve a city of more than 200,000 population. The powerplant's output represents 3 per cent of all the electricity consumed by Commonwealth Edison's customers.

The $3.5 million zinc sulfide roasting plant and sulfuric acid plant at Danville, Ont., has been completed and will be in operation soon, reports **Sherbrooke Metallurgical Ltd.**

Raytheon Canada Ltd. dedicated its 34,000 sq ft headquarters plant at Waterloo, Ont. Cost: $400,000.

Electric Reduction Co. is constructing a $10 million chemical plant at Danville, Ont. It will be in operation in the spring.

U. S. Aluminum Siding Corp. is building a $2 million plant in the Clearing Industrial District, Chicago, Ill. The 66,000 sq ft of operating space will be used to produce aluminum siding and accessories. The line will ultimately be broadened to include all types of aluminum building products.

CONSOLIDATIONS

Brummer Seal Co., Chicago Heights, Ill., manufacturer of mechanical seals, has been acquired by the **Spring Div.**, Borg-Warner Corp., Chicago. Brummer Seal will be operated as a part of Borg-Warner's Spring Div. which is headed by A. J. Welch, president and general manager.

Natural Gas Pipeline Co. of America took over the assets and operations of **Peoples Gulf Coast Natural Gas Pipeline Co.** Both companies own long distance supply lines and are subsidiaries of the Peoples Gas Light & Coke Co., Chicago.

ASSOCIATIONS

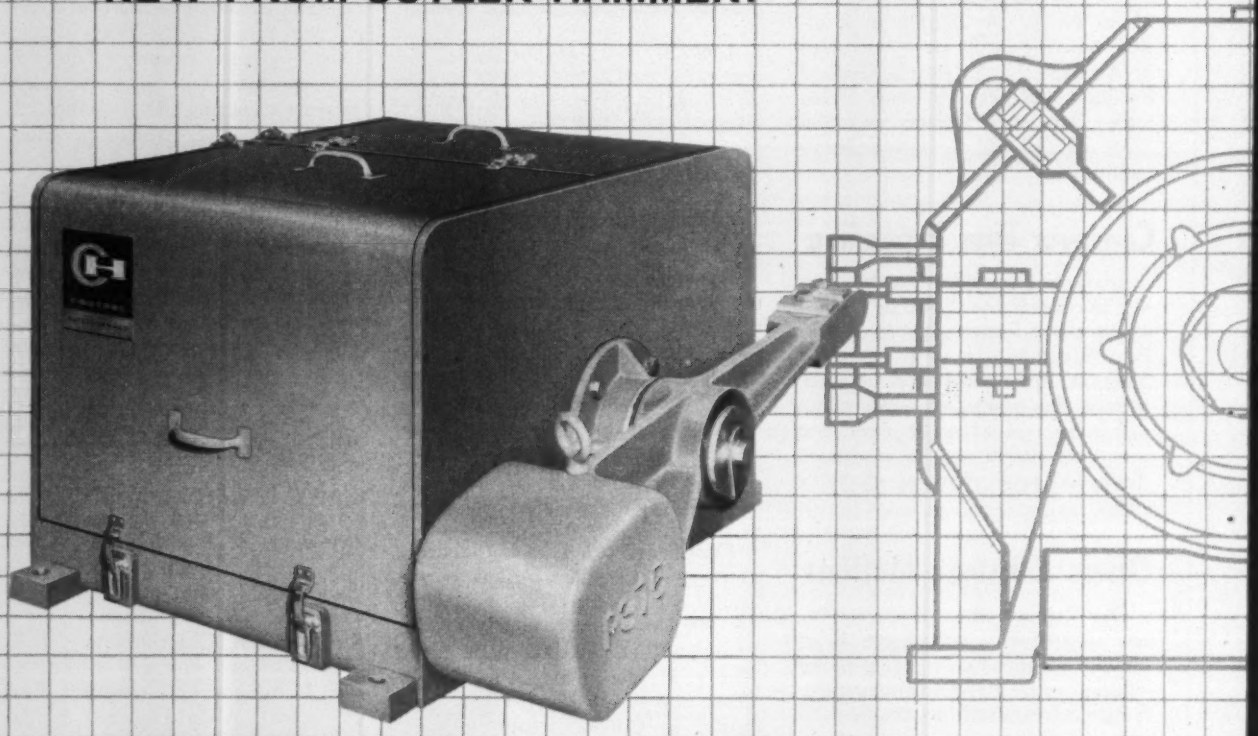
Gray Iron Founders' Society Inc., Cleveland, elected these officers: President, J. E. McIntyre, Sibley Machine & Foundry Corp., South Bend, Ind.; vice president, Cecil Garland, W. O. Larson Foundry Co., Grafton, Ohio; secretary, J. T. Boyd, Goldens' Foundry & Machine Co., Columbus, Ga.; treasurer, Paul H. Scherf, Alten Foundry & Machine Works Inc., Lancaster, Ohio; and assistant treasurer, W. F. Seelbach, Forest City Foundries Co., Cleveland. Donald H. Workman was reappointed executive vice president.

Charles R. Bender has been appointed executive secretary of the **National Tool & Die Manufacturers Association**, Cleveland.

Pressed Metal Institute, Cleveland, elected these officers: President, M. A. Sherwood, Grand Haven Stamped Products Co., Grand Haven, Mich.; secretary-treasurer, W. Bryant Gemmill, American Stamping Co., Cleveland; honorary secretary-treasurer, Melvin Lorentz, HPL Mfg. Co., Cleveland; and vice presidents, W. J. Primrose Jr., Dickey-Grabler Co., Cleveland, and C. W. Cederberg, Larson Tool & Stamping Co., Attleboro, Mass.

CONTROL

NEW FROM CUTLER-HAMMER!



P-375 CRANE SAFETY LIMIT STOP

EXCLUSIVE—FOR FRAME 618-622 MILL MOTORS

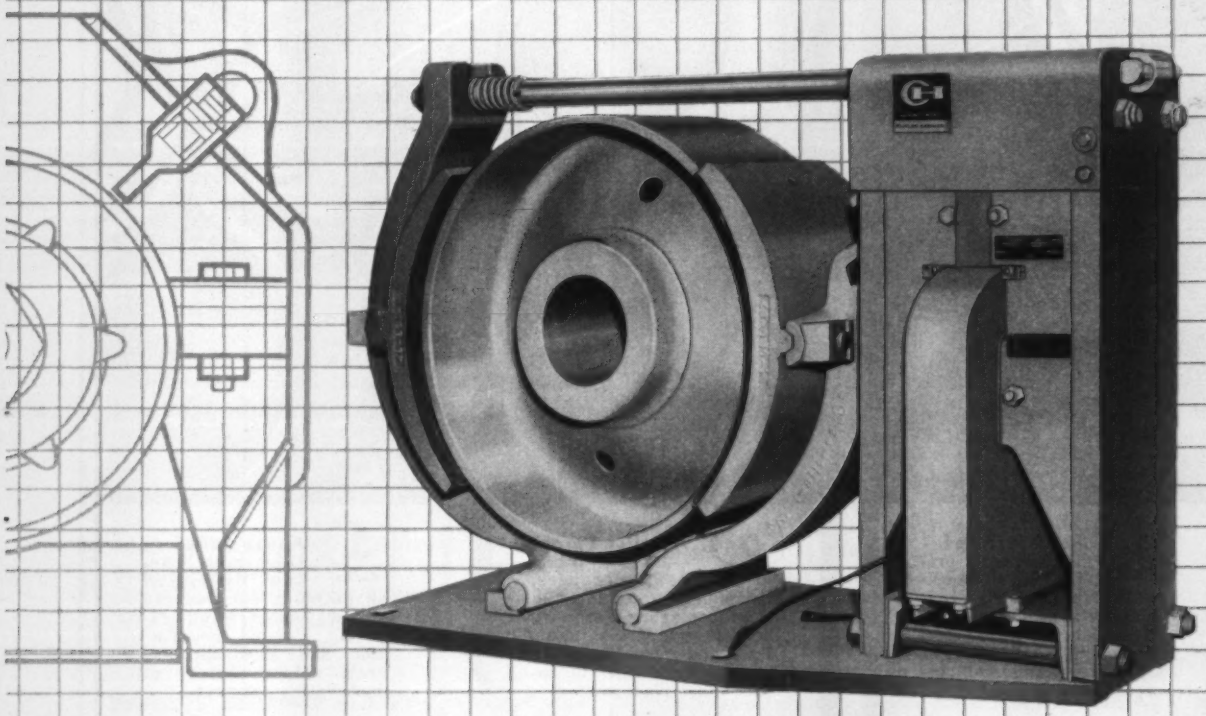
2 exclusive accessories

New Cutler-Hammer P-375 Crane Safety Limit Stop is especially designed for safe operation of large frame 618-622 mill motors. It is the *only* crane stop that eliminates the need for duplex switches for applications over 200 hp. Bearings are prelubricated and sealed. The heavy fabricated steel construction of the P-375 makes it highly resistant to the shock and stress of crane duty. Weathertight enclosure permits outside use. P-1, P-100, P-200 crane stops are also available for smaller cranes. For complete details call the nearest Cutler-Hammer sales office.

With the new 30″ 505 Mill Brake Cutler-Hammer offers the finest line of D-c mill brakes and the broadest range of sizes. You can get the 505 Mill Brake in 8″, 10″, 13″, 16″, 19″, 23″ and 30″.

Simplicity of design makes the 505 line extremely reliable. Only 10 major parts, all easily accessible. All adjustments can be easily made. Get full details by sending for Pub. U213.

The same kind of reliability that has made Cutler-Hammer mill control equipment preferred by so many mill engineers has been built into the P-375 Crane Stop and the 30″ Mill Brake.



30" 505 MILL BRAKE

EXCLUSIVE—FOR FRAME 620-622-624 MILL MOTORS

for large mill motors!

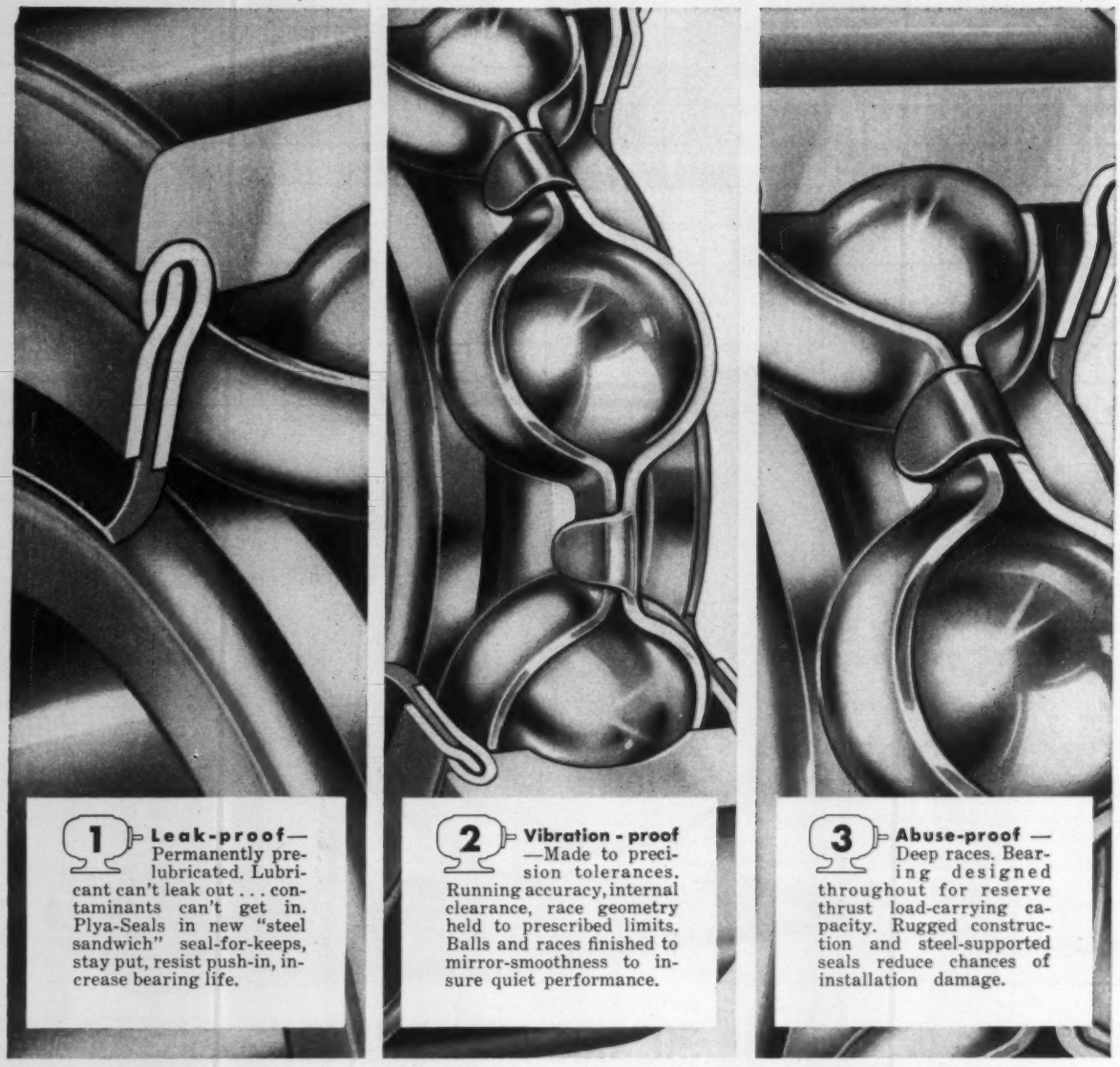
WHAT'S NEW AT CUTLER-HAMMER?
New, better products like these two are being constantly developed by Cutler-Hammer. We're ready for the great technological growth of this decade with the plant facilities, engineering talent and a desire to help you grow. Contact the nearest Cutler-Hammer sales office to see how we can help you.

WHAT'S NEW? ASK...

CUTLER-HAMMER

CONTROL

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. • Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.



1 **Leak-proof**—Permanently prelubricated. Lubricant can't leak out . . . contaminants can't get in. Plya-Seals in new "steel sandwich" seal-for-keeps, stay put, resist push-in, increase bearing life.

2 **Vibration - proof**—Made to precision tolerances. Running accuracy, internal clearance, race geometry held to prescribed limits. Balls and races finished to mirror-smoothness to insure quiet performance.

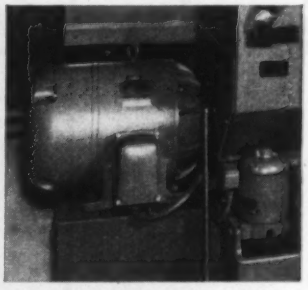
3 **Abuse-proof**—Deep races. Bearing designed throughout for reserve thrust load-carrying capacity. Rugged construction and steel-supported seals reduce chances of installation damage.

Fafnir gives you the seal . . . the "smoothness" . . . the stamina you need in ball bearings for electric motors!

Notice the seals in this Fafnir ball bearing. They're "rolled in". These newly designed Plya-Seals won't work loose because they are gripped between two steel supports . . . nor will they push in. They provide positive protection against contaminants and loss of lubricant.

You also get whisper-quiet performance. Balls and races in Fafnir precision ball bearings for electric motors are micro-finished to mirror-smoothness. No noise . . . no vibration. Extra-deep race design adds thrust capacity and minimizes mounting damage.

Look to Fafnir for *your* electric motor ball bearings. You'll find all sizes and types (open, shielded, or with contact, slinger, or felt type seals) . . . plus the capacity and uniformly high quality to meet your needs precisely. The Fafnir Bearing Company, New Britain, Conn.



Over 5000 electric motors in Fafnir's six plants including these 10 HP and ½ HP units, offer on-the-spot proving-grounds for electric motor bearing designs.

FAFNIR
BALL BEARINGS

STEEL

Technical Outlook

DIRECT REDUCTION— Ethyl Corp., New York, is checking out a new process for getting pure titanium, zirconium, thorium, chromium, or vanadium directly from the oxides. Combination of oxides, calcium chloride, and sodium produces calcium, which reacts with the oxides releasing the desired metal. Byproducts are leached out. Key to success: Keeping out insoluble byproducts by carefully controlling ingredients.

STEELMAKING NOTE— Tiny aluminum pellets called Frac-Shot (Reynolds Metals Co., Richmond, Va.) are said to speed up the killing of steel and make dispersion in the ladle more thorough. It's rumored that at least one steel firm is interested. The pellets were originally designed for an oil well reclamation job.

MOWING CLUTCHES— Centrifugal clutches have invaded the home power tool field. Producer: Gutbrodag A.G., Germany. Its lawn tool power unit has a 3¼ hp, 4 cycle engine and a clutch with three spring loaded weights that actuate at 1200 rpm. Cost: About $90.

DETECTS BEARING FLAWS— A device developed by SKF Industries Inc., Philadelphia, is so sensitive it can discover flaws only 10 millionths of an inch deep (0.000010 in.). Comparison: Detecting the displacement of a marble rolling over a defect the size of a human hair that has been split 30,000 times.

MISSILE MUSCLE— Test casings made of a new missile steel have withstood internal pressures of 300,000 psi, claims Ingersoll-Kalamazoo Div., Borg-Warner Corp. It developed the steel for the Navy.

FUEL CELL RESEARCH—A five year, research program to advance fuel cell technology, underwritten by 25 companies, has just begun at Battelle Memorial Institute, Columbus, Ohio. Much of the research will be aimed at obtaining a better understanding of the properties of materials required in a cell and developing materials which approach the ideal. Battelle will study the internal electronic structure of alloys, thin films of metals, and unusual plating techniques to apply porous metal surfaces to electroformed electrodes.

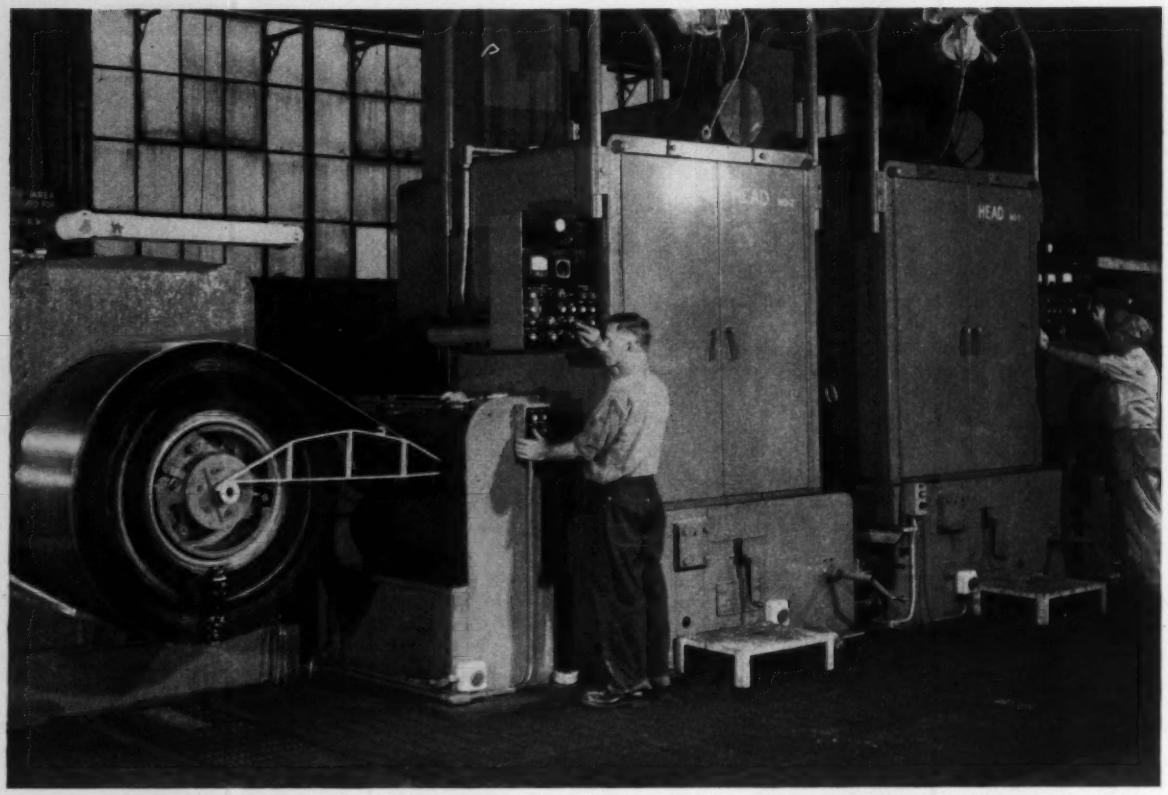
UPS OPEN HEARTH EFFICIENCY—The Russians claim to get 3 to 8 per cent more output from open hearths, greater alloy uniformity, and improved economy by adding alloying constituents directly to ladles instead of the furnace. Ten or 15 ton ladles are filled one third from open hearths, then loaded with alloys and deoxidants.

WAY TO DENSER COMPACTS—Compressing and deforming individual particles of extremely fine metal powders prior to compaction has been shown to increase the apparent density, claims Commissariat a l'Energie Atomique, Paris. The powders can be run continuously through two rollers driven at different speeds to shear the particles, breaking surface films and starting cold weld bonds.

SPEEDS TOOL GRINDING— DeVlieg Machine Co.'s latest grinding device for cemented carbide, high speed steel, and ceramic cutting tools produces profiles on 300 identical tools in one setup. The Royal Oak, Mich., firm claims the machine can significantly increase tool life.

NEW MARINE TRANSMISSION— Look for hydrostatic transmissions to make an appearance on special duty amphibious vehicles for defense purposes. Several types have been developed in Europe; at least one U. S. firm is working on a design.

TITANIUM GETS COLOR COAT— Titanium nameplates or identification tags can be colored by a new process which requires no dyes or paints; the colors are unchanged at 600° F, still legible at 1000° F. Colored marine hardware requires no polishing or cleaning after installation.



"Decrowned" stainless steel strip emerges from the two machine, abrasive belt grinding line. The line adds a new degree of precision to aircraft-missile quality strip by providing consistent thickness

Grinding Opens New Strip Market

DEMANDS of aircraft and missile-makers for microtolerance stainless steel strip are being met by specialists at Wallingford Steel Co., Wallingford, Conn.

Combining careful strip rolling with some new techniques in abrasive belt grinding, the company is turning out foil-thin strip, holding tolerances of ±3 per cent on 0.001 in. thick material. One use: Honeycomb cores for North American Aviation's B-70 superbomber.

E. B. Cleborne, Wallingford president, says the aircraft industry had problems with excess weight. Thin material was not enough; the aircraft people also had to have uniform thickness over-all, so that the traditional "crown" in the center of the strip (left by all rolling methods) wouldn't add costly pounds to the airframe.

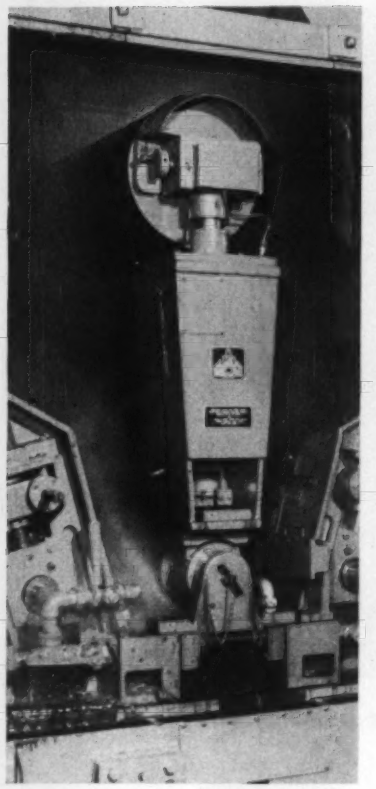
• Grinding technique corrects strip profile, holds thickness variations across the width to less than 0.0005 in.

Strip generally comes from the hot mill with edges thinner than the center section. The crown is only slightly corrected by further rolling, so it is present even in the thinnest foil.

The crown is now machined off at Wallingford in a two-machine grinding line built by Hill Acme Co., Cleveland. The grinding line is a result of eight years of joint development work by engineers at Wallingford and Behr-Manning Co., Troy, N. Y.

Several novel features are combined to flatten the strip as it approaches the grinding area, providing a true reference for geometry correction. The coil is under endwise tension of 30,000 lb. Also, it is bent at angles up to 20 degrees by being forced under break rolls as it approaches and leaves the grinding point. A solid steel, work support roll that's 8 in. in diameter forces the strip against the belt by hydraulic pressure.

Dynamically balanced contact rolls are knurled steel or serrated rubber in a range of 45 to 90 Durometer. They operate at 900 and 1800 rpm to give belt speeds of 2100 or 4200 surface feet a minute. Work is generally fed to the abrasive belts at speeds of 6 to 36 ft a



The machine doors are opened to show the 30-in.-wide belt removing crown at a surface speed of 4200 surface feet a minute. Oil floods at the rate of 65 gallons a minute

minute, depending on the depth of cut, type of stock, and the surface finish desired.

The belts (30 x 126 in. cloth, all resin bonded with aluminum oxide or silicon carbide abrasives) grind in a flood of sulfur-chlorinated oil pumped to each grinding head at 65 gallons a minute from a 4000 gallon reservoir and Delpark filtration system.

• In addition to producing better quality strip, the new line is expected to pay off the investment (nearly $300,000) at a rate of well over $91,000 a year.

The company used to grind its stock on two lines which included five machines. In one shift, the new, two machine line can outproduce the former setup 3 to 1. A ten-coil order can now be finished in 12 hours; it used to take 65.

Commenting on relative costs, P. S. Gittings, manager of industrial engineering at Wallingford, calculated the savings on the corrective grinding done during the second quarter of 1959. He says: "281,460 ft of steel were ground. The cost of belts and labor for dry grinding was about $49,250. The new oil grinding of the same footage would cost $19,700—a projected saving of $118,000 a year.

"It took 1565 hours or 195 shifts to grind 268 coils in 1959. By oil grinding, these coils can be finished in about 616 hours, or 77 shifts."

In many cases, one pass is doing the work that used to take three.

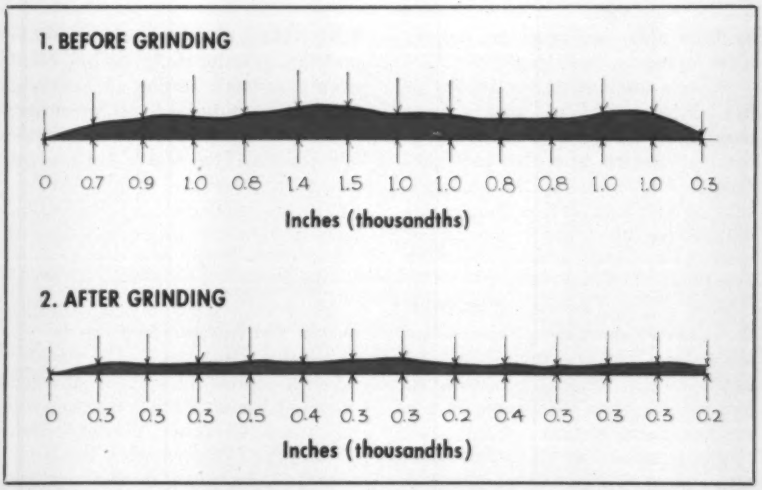
• The company is shipping stainless strip ground to a flatness which meets aircraft and missile specifications.

Mr. Cleborne continues: "Those industries have been clamoring for such strip for at least four years, but our industry has had no way to supply it. Obviously, such a product will offer great advantages for countless conventional applications as well."

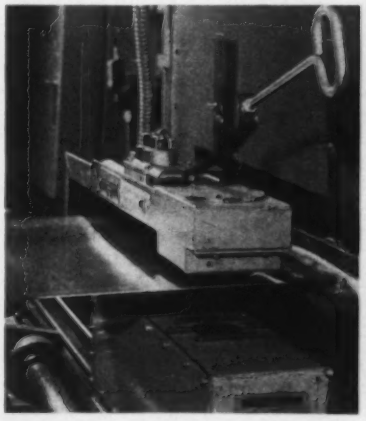
With his plant's capacity for ground strip more than tripled, Mr. Cleborne leaves no doubt that the company intends to market the precision strip on a big scale.

He admits that when Wallingford went into the program, it was attracted by the prices the aircraft industry was willing to pay for close tolerance, thin strip (as high as $37,930 a ton), and it knew little about solving some of the problems involved.

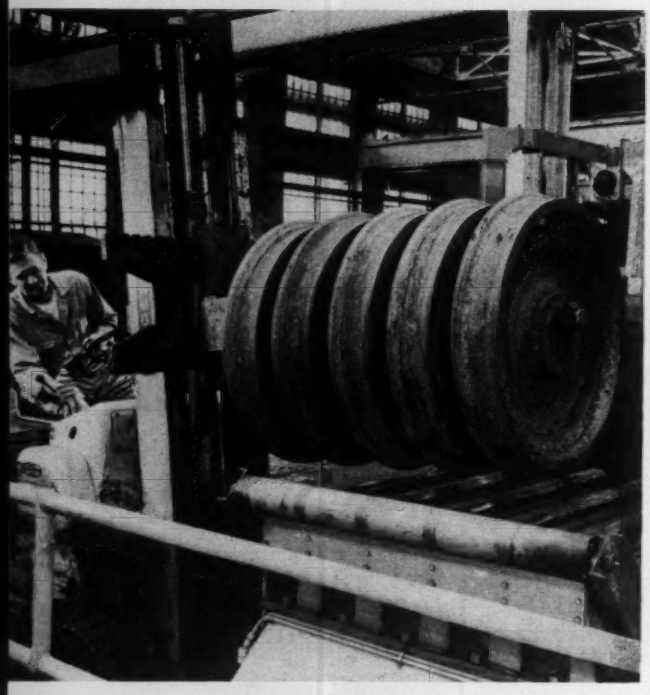
Now, he feels, the problems are solved, and he gives much of the credit to the closely controlled oil grinding.


1. BEFORE GRINDING
0 0.7 0.9 1.0 0.8 1.4 1.5 1.0 1.0 0.8 0.8 1.0 1.0 0.3
Inches (thousandths)
2. AFTER GRINDING
0 0.3 0.3 0.3 0.5 0.4 0.3 0.3 0.2 0.4 0.3 0.3 0.3 0.2
Inches (thousandths)

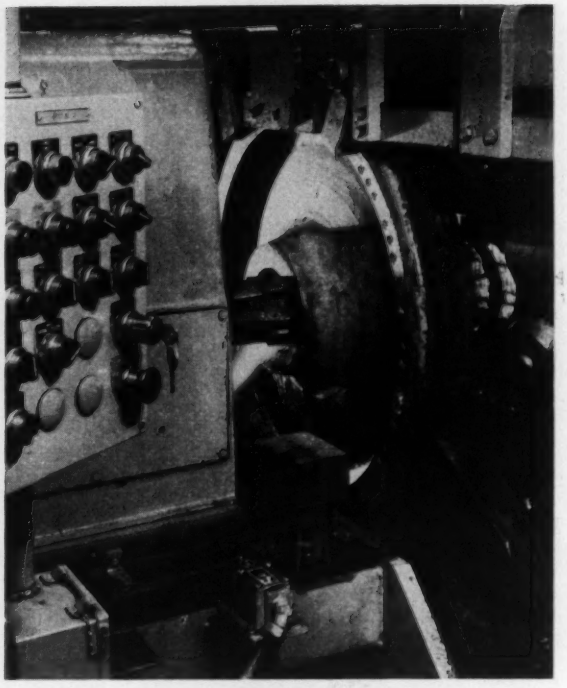
Here's how the grinding process improves the profile of a stainless strip. Above, the strip (soft temper) has a maximum thickness variation of 0.0015 in. After grinding (below) the maximum variation at the same point on the same strip has been cut to 0.0005 in.



Between the two grinding machines, this x-ray head moves back and forth, checking strip thickness. The unit operates a stylus in a remote console. Final inspection is done on an interferometer, results accompany the order



Five forgings enter the line . . .



hubs are bored horizontally . . .

Transfer Line Makes Better Wheels

AN AUTOMATED transfer line produces railroad car wheels faster and more accurately than the previously used individual machines at Standard Steel Works Div., Baldwin-Lima-Hamilton Corp., Burnham, Pa.

The five-machine line, which does boring, facing, and turning operations in sequence, turns out a finished wheel every 75 seconds. It was designed by Kearney & Trecker Corp., Milwaukee.

• Each machine in the line is an independent unit—interlocked with load, unload, and inspection stations.

Central controls permit the operation of the entire line as a single machine, or as individual units. Settings, operational control, and all other line functions are handled by four men—an operator, helper, truck operator, and inspector.

Wheels are loaded, in groups of five, into a preload storage unit that discharges automatically into the load station when the load carriage is empty and in the right position. The load station indexes automatically after every machining cycle and places a wheel on the main line.

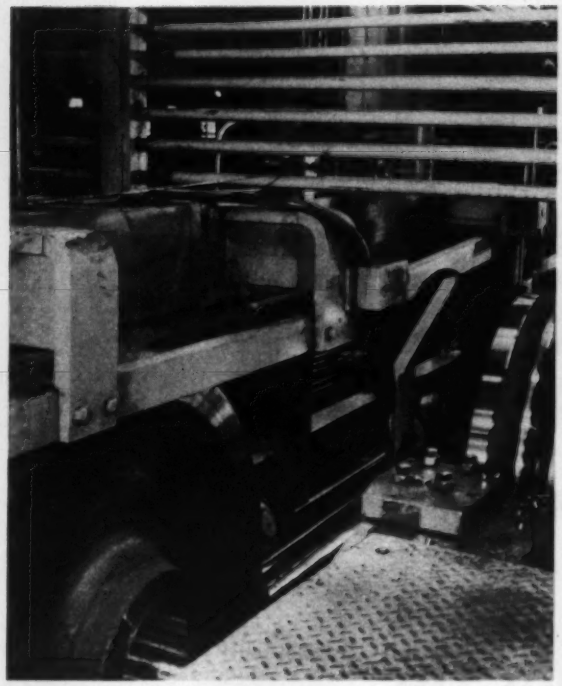
Work in process passes through the various machining stations to an unload station, which indexes automatically until it has received five wheels, then discharges into a postmachining station.

The transfer line stops automatically when the postmachining station contains five wheels. After removing a load from the station, the operator must press an interlock button to keep the machine in cycle.

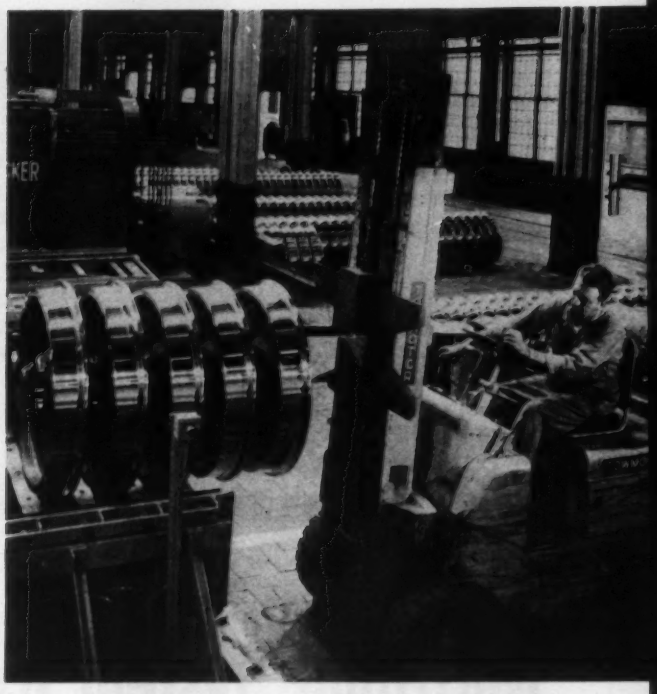
• Handling of wheels in a vertical position permits them to be rolled from one work station to another; that makes material handling easier.

The rolling function of the wheel is exploited. The wheels are pushed along on a section of rail by hydraulically actuated rollers, which keep each one in proper relation to the others. Previously, wheels were machined in the horizontal position.

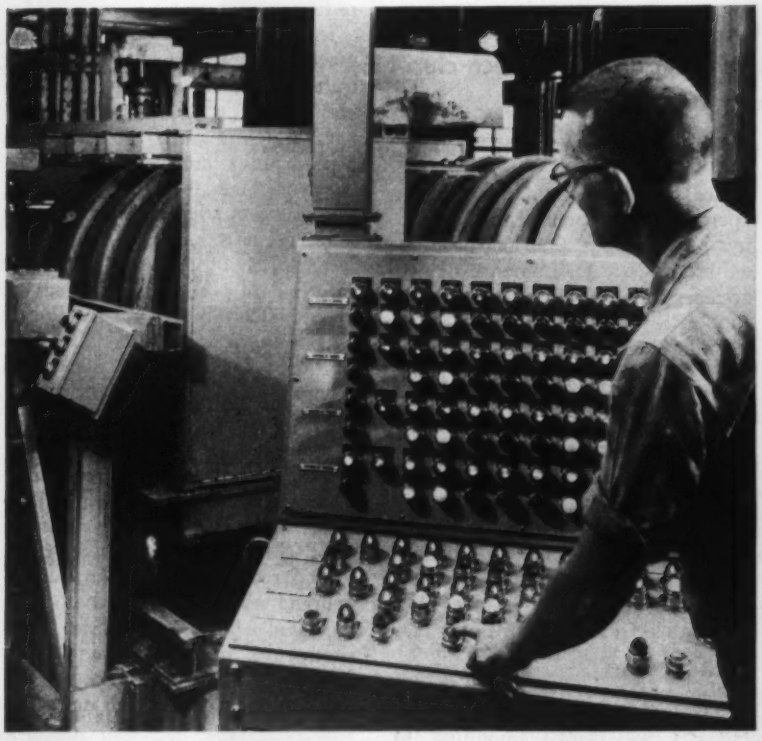
Move-out stations along the line permit individual wheels to be removed for inspection. The stations allow complete inspection of each wheel at the machine, with no work interruption. When the inspection is completed, the wheel is easily returned to its place in the transfer line. Later, it is discharged into the indexing unload station. Finished wheels are hauled away from the transfer line with a fork lift truck.



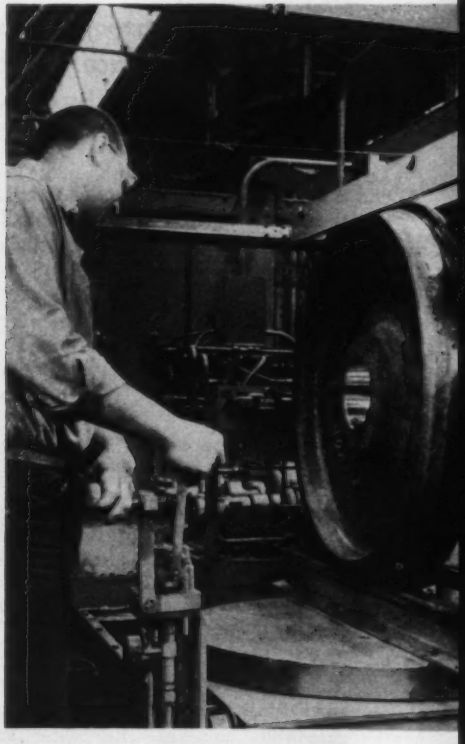
flange and tread are turned . . .



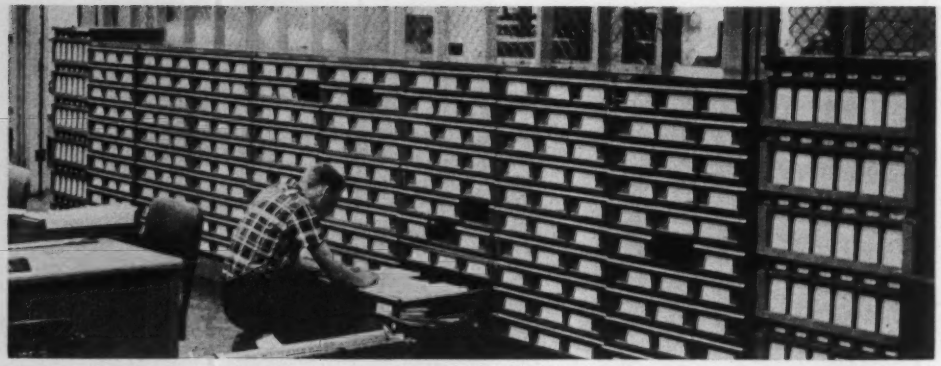
finished wheels are unloaded



Lights on this console are keyed to machining and transfer functions along the line. Centralized controls allow the entire line to be handled as one unit; or the individual machine tools may be operated independently



Partly finished wheel is taken from the line for inspection. It will be re-inserted for further machining



Microfilmed engineering documents for the entire guided missile program (850,000) are stored in the cabinets above (at the Redstone Arsenal)

Microfilm System Keeps Up With Space Program Needs

Army missile agency can store 100,000 drawings in only 4 sq ft of floor space. It has also been able to reduce clerical filing personnel by more than 40 per cent

AT THE Army's Redstone Arsenal, the rapid expansion of the missile program outstripped the blueprint and drawing filing system and led to some handling problems.

1. More than 850,000 drawings are in the active file. About 1.5 million are in the historical file. They had to be set up for fast reference.

2. A system had to be arranged to reproduce quantities of drawings quickly and economically.

3. Drawings had to be available for quick and easy scanning by engineers and other personnel.

4. Easy system maintenance was a must.

• In 1957, a microfilm-punched card system was started with two microfilm cameras and some accounting machines.

After a check for accuracy and legibility, the drawings were microfilmed, developed, and mounted in aperture cards punched with drawing information. One of the difficulties was the maintenance of two systems during the changeover, says the U. S. Army Rocket & Guided Missile Agency (ARGMA).

• The system trimmed filing and retrieval time, keeps 100,000 drawings in only 4 sq ft of floor space, and has cut clerical help by 40 per cent.

In addition, ARGMA reports substantial dollar savings. Sorting, card reproduction, filing, and retrieving are all handled by high speed electrical accounting machines.

• Savings in producing quantity requests for prints amounted to $53,000 the first month. As many as ten days have been lopped off waiting periods.

Up to 20 ft of finished drawings per minute can be printed from cards to plain bond or reproducible paper. An automatic electrostatic printer is used. Each drawing is clipped off automatically as it leaves the machine. One to 400 copies can be printed from any card by setting a dial.

In engineering, automatic viewing machines project a drawing for the technician, then take 10 seconds to make an 18 x 24 in. paper reproduction (from cards).

Two units are set up to print from originals to duplicards. One, a small, manually fed machine, fills small requests for drawings in film form. The other is an automatic card to card printer. (It reproduces about 600 film cards an hour.) Only duplicates are used for reproduction. This makes it possible to keep the master file up to date at all times.

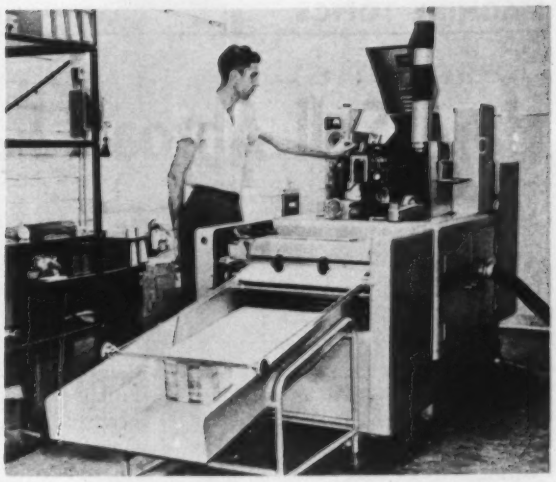
• Prime contractors supply complete engineering records in microfilm mounted in aperture cards.

ARGMA says the policy has helped reduce demands on personnel and equipment and has made increased efficiency possible. For contractors unable to handle the data preparation, the agency microfilms, maintains, and provides cards.

• Plans call for an expanded card system.

Under study are modifications

This business machine can print out any desired tabulation of information from microfilm holding aperture cards



Card to paper printing can be done at the rate of 20 ft of finished drawings per minute

that will permit a faster search through the filed microfilm. Closed circuit television is being considered to bring filed documents rapidly to the engineer.

• One of the outstanding punch card projects is the generation breakdown. The system, devised by ARGMA's Documentation Center personnel covers related data for engineering drawings.

The punch card deck is rather simple in design and is furnished by the contractors along with the engineering drawing microfilm card. From the one deck of cards ARGMA can mechanically prepare:

1. A complete generation breakdown to include nuts, bolts, and screws for any major item of any given missile or rocket system.
2. Engineering parts lists.
3. Engineering drawing lists.
4. Engineering specifications lists.
5. Part usage lists.
6. Engineering drawing number accountability.

Through the system, about 476,000 items for any one major item can be mechanically controlled, with the possibility of making about 2000 changes and additions between any two line items of that major item.

Here are some of the ways ARGMA uses the system:

1. To mechanize the preparation of an engineering document of parts contained in a major item component, in assembly order, of a given system.
2. To mechanize the preparation of drawing lists.
3. To mechanize the preparation of specification lists.
4. To mechanize the preparation of parts lists.
5. To provide a mechanized method of inventorying engineering drawings and documents.
6. To provide an aid for standardization of specifications.
7. To expedite and assist procurement.

One project eliminated individual packaging data sheets for about 75 per cent of the repair part items. Savings run into thousands of dollars annually.

A paper copy from microfilm can be made in 10 seconds by this viewer

Hard Sell Abroad Pays Off

A machine tool builder cites the need for "pepping up" foreign distributors, plus the customer service and training that's offered in this country

MACHINE tool builders can sell successfully in overseas markets, but they'll have to buckle down . . . and not just depend on demand, price cutting, or the boast that the product is better because it's made in the U. S., declares H. A. Beyer, sales vice president, DeVlieg Machine Co., Detroit.

DeVlieg says 20 to 25 per cent of its current shipments go abroad. Mr. Beyer anticipates a 20 per cent increase in export sales next year. England is one of the large markets for DeVlieg Jigmils; the company also has markets in Western Europe; Japan, and India.

Mr. Beyer feels his company has not realized its full sales potential in some areas of Western Europe.

"I think we can get a lot more business there by good, aggressive merchandising. Look at the time, effort, and help machine tool builders give their distributors in this country. The same assists are needed abroad."

• The European way of life may be responsible for a more leisurely selling pace.

"I get the impression that few continental salesmen are as progressive or as aggressive as we are here. This means U. S. sales executives may have to make frequent trips abroad to educate, train, and pep up overseas distributors and their customers. We can do much better this way than by cutting our prices.

DeVlieg's Mr. Beyer says: "I think we can get a lot more business overseas by good aggressive merchandising. We must give the same assists to foreign distributors that we do domestic."

"We make a big fuss about price cutting, but in some areas abroad, it's an accepted way of doing business," he says. For one thing, distributors of foreignmade machines get as much as three times the commission that U. S. distributors do—so distributors have room to crop the price. "We can't afford to give our foreign distributors these high commissions, so we're often competing against a price disadvantage that could total 30 per cent or more."

• Quality and productivity are the big competitive weapons.

DeVlieg figures its Jigmils are as accurate as the best borers in Europe, and says they are even more productive than European counterparts. "In addition, we make it a point to offer lots of service. After all, it's no more difficult today to fly to Europe to service a customer than it used to be to fly to California," declares Mr. Beyer.

Those selling tools are paying off for DeVlieg. The company recently delivered a Jigmil to a Swiss builder of machine tools, who had considered a locally built machine. "The customer was willing to pay a slightly higher price for our Jigmil because it was equally accurate and about a third faster," claims Mr. Beyer.

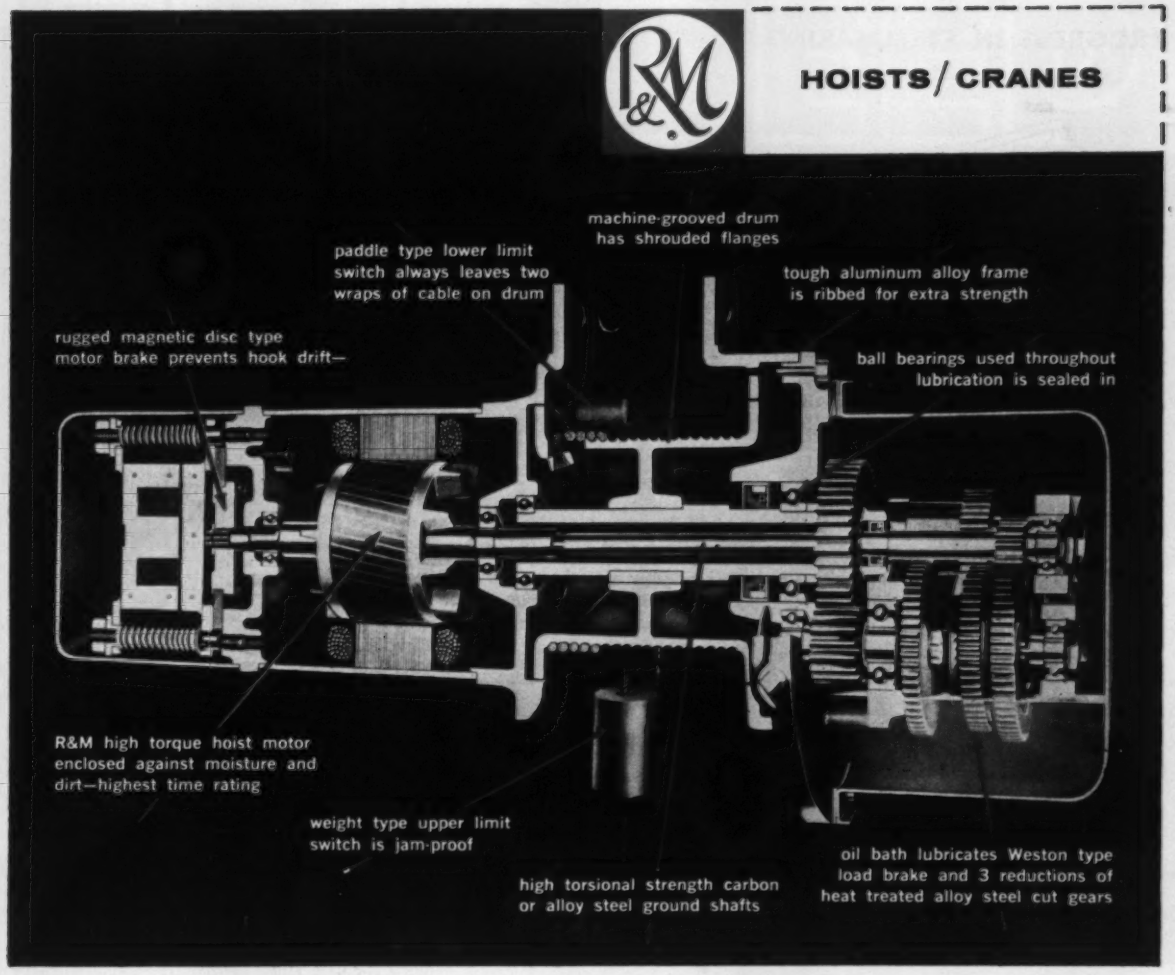
• De Vlieg hesitates to build a plant overseas.

"Sometime we may be forced to consider a plant in Germany, for example, but for our kind of equipment we'd have problems staffing it adequately. Contrary to popular opinion, there is a definite shortage of skilled labor on the continent. Then, too, we have a British licensee that does an excellent job."

Partly as a result of its foreign business, DeVlieg has a six month order backlog. Mr. Beyer says new orders are running at the highest rate since mid-1957, the company's record sales year.

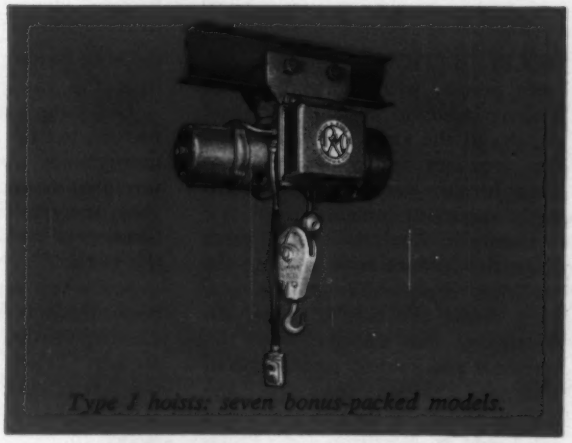
About 50 per cent of the machines the company ships are tape controlled, or have the dial-in numerical control system.

The rest of the machines are manually operated.


HOISTS/CRANES
machine-grooved drum has shrouded flanges
paddle type lower limit switch always leaves two wraps of cable on drum
tough aluminum alloy frame is ribbed for extra strength
rugged magnetic disc type motor brake prevents hook drift—
ball bearings used throughout lubrication is sealed in
R&M high torque hoist motor enclosed against moisture and dirt—highest time rating
weight type upper limit switch is jam-proof
high torsional strength carbon or alloy steel ground shafts
oil bath lubricates Weston type load brake and 3 reductions of heat treated alloy steel cut gears

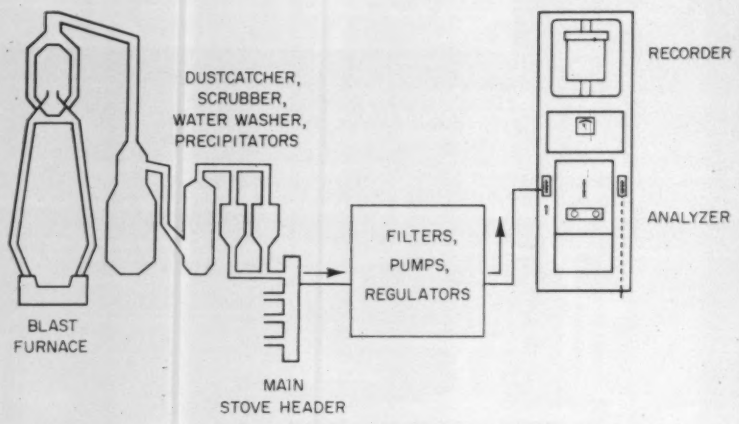
HOIST VALUE WHERE YOU NEED IT

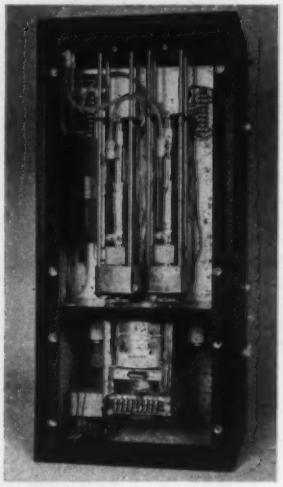
Robbins & Myers Type J hoists can go to work for you this week. Since they are stocked near you, it's no trick at all to see—and benefit from R&M's superb design advantages. They give value beyond competitive price: *because* no other hoist has a higher rated, better protected motor (30 minute, 55° C. rise), *because* you get two brakes—a disc type motor brake and a Weston type load brake, *because* you get upper and lower non-jamming limit switches. Ball bearings are used throughout and the three reductions of heat treated alloy steel gears are lubricated in a sealed bath. Capacities—¼, ½, 1 and 2 tons; mounting—lug is standard, push, hand geared and motorized trolleys are available. Voltage is reduced at the push-buttons; control is magnetic. Request Bulletin 905 from the Hoist & Crane Division of Robbins & Myers, Inc., Springfield, Ohio or Brantford, Ontario.



ROBBINS & MYERS

hoists & cranes, Moyno® pumps, motors, Propellair® fans





Sample line tied into the main stove header carries gas through a filter system and into the analyzer. A thermal conductivity cell measures the percentage of hydrogen; infrared columns measure the percentage of carbon dioxide and carbon monoxide

Three Way System Analyzes Blast Furnace Top Gases

Three critical top gases are measured in rapid sequence with instruments mounted in a common cabinet. Then all percentages are recorded on the same strip chart

ACCELERATION of the blast furnace process with automatic stock feeding, addition of fuel gases and oxygen to the air blast, and higher top pressures make monitoring of blast furnace variables an increasingly important function.

Example: Analysis of top gases helps the furnace crew regulate the chemical composition of the iron long before the cast is made. An instrument that simultaneously determines and records percentages of hydrogen, carbon monoxide, and carbon dioxide in the gases is offered by Leeds & Northrup Co., Philadelphia.

• Top gas is taken to the analyzer through a sample line tapped into the blast furnace system downstream from the gas cleaning equipment.

The sampling line can be connected to the system anywhere downstream from the electrostatic precipitators—and steelmen anticipate analysis of gases nearer the furnace, or periodic sampling inside the stack.

As the top gas leaves the stack, it passes through the downcomer, dustcatcher, Venturi scrubber, and water washer. Then it passes through the precipitators and into the main stove header, where the sample line is tied in.

A diaphragm type pump is used to draw a continuous flow of gas through a series of filters and into the analyzer.

• Three detecting units in the same cabinet indicate percentages of basic gases present.

Continuous flow of sample gas through all the analyzer cells insures rapid analysis. Gases pass first through a thermal conductivity cell, then through two infrared units.

In the gold coated infrared cells, the sample gas is exposed to radiation focused on a series of thermocouples. Molecular structures of the gases determine the wave lengths of infrared radiation they absorb; measurement of the electrical energy output of the thermocouples indicates the percentages of carbon monoxide and carbon dioxide in the sample.

The thermal conductivity cell uses a Wheatstone bridge circuit to measure the resistance of a heated wire surrounded by the sample gas. Value of that resistance is proportional to the thermal conductivity of the gas; the output signal from the bridge indicates hydrogen concentration.

Output signals from the measuring cells are indicated on a multiple point recorder that automatically switches from one cell to another at 4 second intervals, and records each measured percentage.

FIVE-DEEP

Millions in technology

help you profit with UCM's "FIVE-DEEP" Ferroalloys

1 Technology—many million dollars a year, invested in UCM's 600-man research and development center—helps you produce better, more profitable metals. This is one of the 5 intangible but ever-present extra values of Union Carbide Metals' FIVE-DEEP alloys.

It has brought you more than 100 new alloys and metals designed to give you production economies and improved products. Countless millions have been made and saved because of UCM's research, along with these 4 other extra values:

2 Customer Service brings you our integrated experience in the application of ferroalloys to various melting practices. Engineers from 9 UCM field offices travel a million miles a year to provide on-the-scene assistance.

3 Global Ore Sources assure you uninterrupted supplies of ferroalloys. UCM's close association with world-wide mines provides dependable raw material sources.

4 Unmatched Facilities free you from delivery worries. Only UCM gives you 6 plants—3 with their own power facilities—and 17 warehouses, all located for fast shipments by rail, truck, or water.

5 Strictest Quality Control—with over 100,000 tests per month from mines to shipment—makes sure you always get alloys of uniform size and analysis, with minimum fines, lot after lot.

For better metals, production economies, bigger profits, insist on UCM's FIVE-DEEP alloys. Union Carbide Metals Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y., producer of "Electromet" brand metallurgical products.

"Union Carbide" and "Electromet" are registered trade marks of Union Carbide Corporation.

UNION CARBIDE METALS

Only **ELECTROMET** ferroalloys from **UCM** are so deep in extra values to help you.

At Amana Refrigeration, Inc.

STANOIL

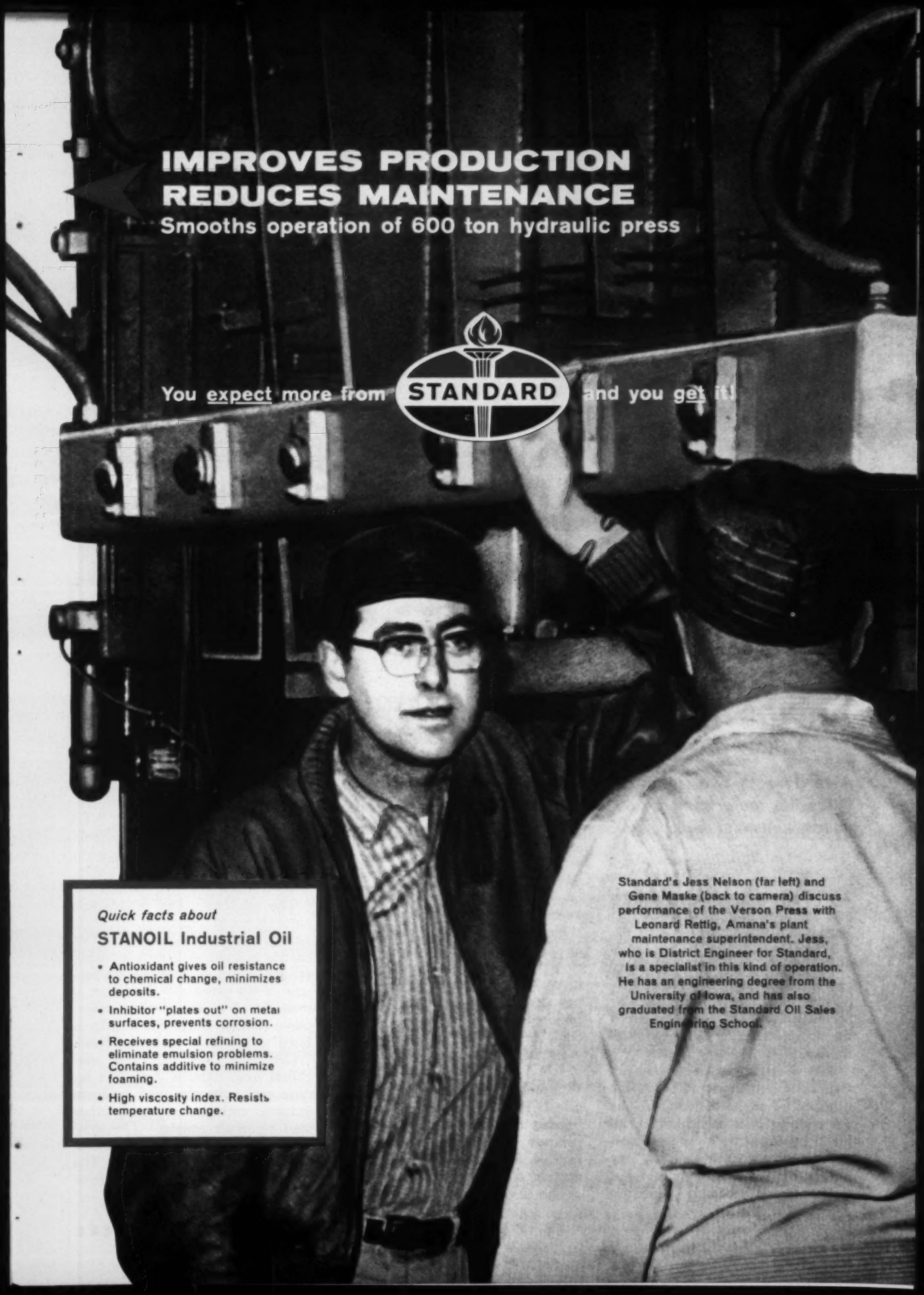
Situation: The 600 ton Verson Press at Amana is a vital operating component in the manufacture of home freezers and refrigerators. Its proper performance is necessary to the efficiency of Amana's entire manufacturing operation. That's why erratic press operation, caused by foaming of the hydraulic oil, was a serious problem.

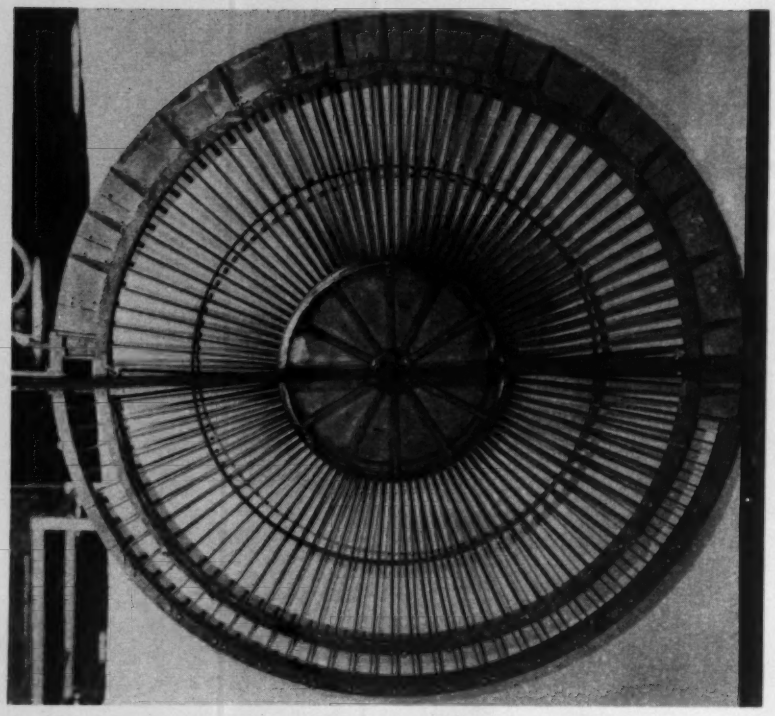
What was done? In seeking the solution to this problem, Amana consulted their Standard Oil lubrication specialist who recommended STANOIL for this service. STANOIL Industrial Oil is a top quality, first-line industrial lubricating and hydraulic oil. It will provide excellent service in many different applications. And when tested by Amana, STANOIL proved perfect for use.

What has happened? Since STANOIL was first put to work at Amana, it has performed for extended periods of time without foaming or oxidation, lengthening the time between drainings and improving press operation. As a result of this record, STANOIL has been adopted for use on other production equipment, together with Standard's RYKON Greases and SUPERLA Soluble Oil.

What you can do: To get help in solving your lubrication problems and to learn more about STANOIL Industrial Oils, simply call the Standard Oil office near you in any of the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue. Chicago 80. Illinois.**

Production manager Neal Stewart reviews Amana's maintenance expense reductions with Standard's Jess Nelson.


IMPROVES PRODUCTION
REDUCES MAINTENANCE
Smooths operation of 600 ton hydraulic press
You expect more from STANDARD and you get it!
Quick facts about
STANOIL Industrial Oil
• Antioxidant gives oil resistance to chemical change, minimizes deposits.
• Inhibitor "plates out" on metal surfaces, prevents corrosion.
• Receives special refining to eliminate emulsion problems. Contains additive to minimize foaming.
• High viscosity index. Resists temperature change.
Standard's Jess Nelson (far left) and Gene Maske (back to camera) discuss performance of the Verson Press with Leonard Rettig, Amana's plant maintenance superintendent. Jess, who is District Engineer for Standard, is a specialist in this kind of operation. He has an engineering degree from the University of Iowa, and has also graduated from the Standard Oil Sales Engineering School.



Exit frame made of Inconel X illustrates wide gap brazing application

New Brazing Technique Solves Fitup Problem

A mixture of two alloys with different melting points provides the material thickness needed to bridge large gaps. Joints withstand 2000° F. Several combinations possible

A NEW brazing technique bridges fitup gaps as big as 0.060 in. in large metal structures.

That's ten times better than former methods, say P. R. Mobley and G. S. Hoppin III, Flight Propulsion Div., General Electric Co., Schenectady, N. Y. They explained the approach at the fall meeting of the American Welding Society.

The wide-gap technique enables General Electric to produce large numbers of stressfree joints in one operation. "It is particularly helpful in joining a wide range of heat and corrosion resistant metals," say Messrs. Mobley and Hoppin.

The largest assembly joined so far is 8 ft in diameter and contains more than 700 pieces.

New brazing materials developed at General Electric have good strength and oxidation resistance up to 2000° F. Jet parts joined the new way have operated several hundred hours at 1500 to 1700° F. Some of the wide-gap brazed joints are stronger than the base metal.

• Success depends on close control of: 1. Ratio of constituents in the brazing mixture. 2. Brazing temperature. 3. Heating and cooling rate. 4. Atmosphere. 5. Joint preparation.

The development stemmed from a need for better turbine nozzle assemblies that go into jet engines. Such parts are made of superstrength alloys that are hard to weld—cracking has been a consistent problem, claim Messrs. Mobley and Hoppin.

The parts in the 8 ft assembly were so large (3 to 4 ft in diameter) that normal manufacturing procedures left gaps of 0.060 in. Normal brazing techniques require that joints be no farther apart than 0.005 in.

Two alloy powders are used in the General Electric technique. Each has a different melting point. In brazing, only one alloy melts; the other becomes the thickener of a slurry which metallurgically bonds itself to the base metals.

Messrs. Mobley and Hoppin point out that a wide variety of dissimilar alloy systems can be used. Here are some which General Electric found satisfactory:

Nickel-chrome-silicon plus nickel.

Nickel-chrome-silicon plus nickel-silicon-boron.

Nickel - chrome - silicon - boron plus nickel-silicon-boron.

Copper - nickel - silicon - manganese plus iron.

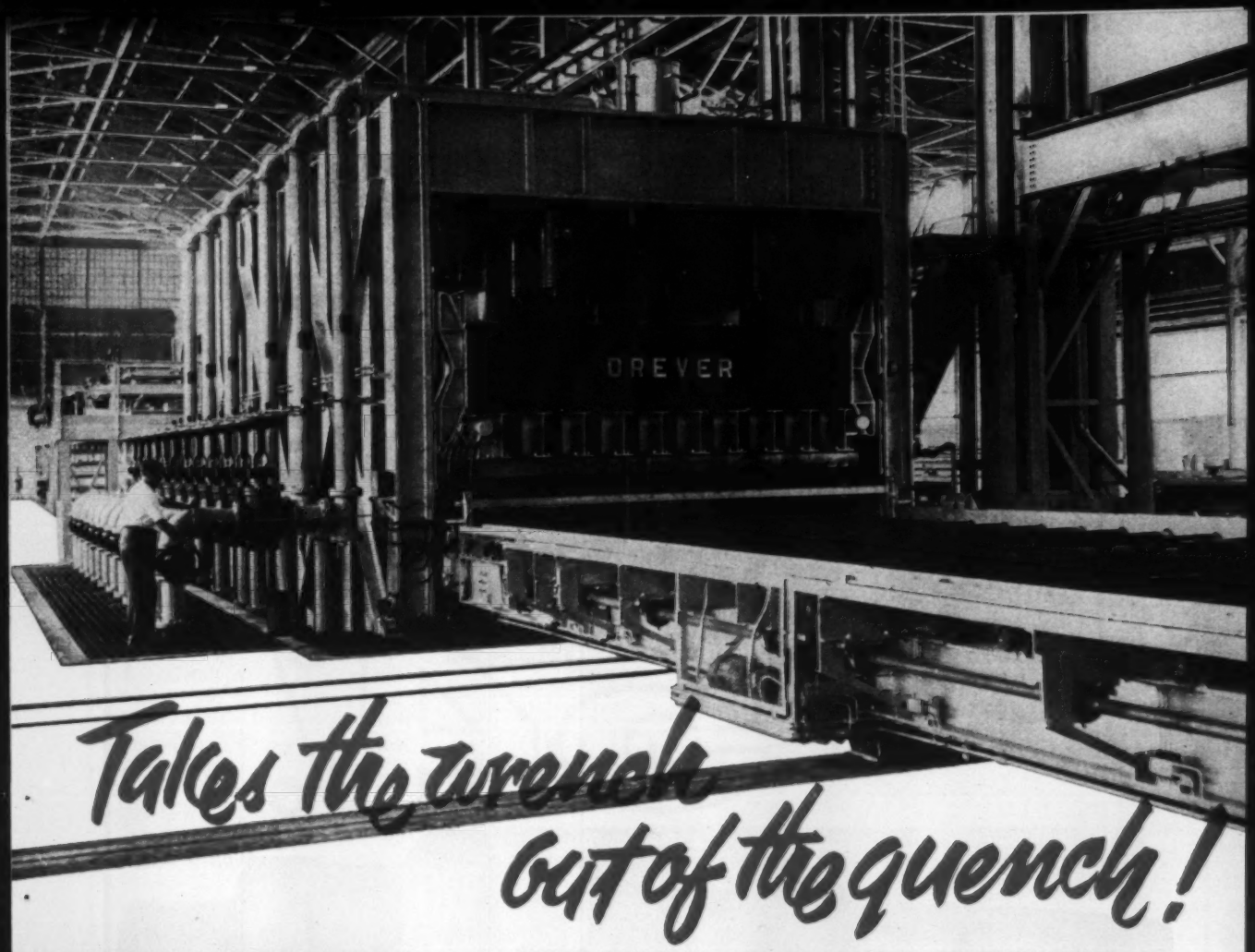
Copper-nickel-indium plus nickel-silicon-boron.

Coating Process Upgrades Corrosion Resistance

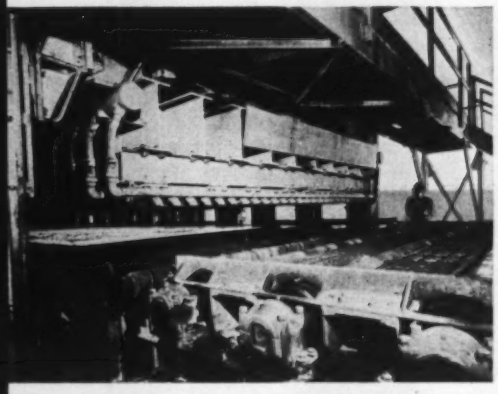
Coating gives a mild steel, outboard motor driveshaft the corrosion resistance of stainless and makes it possible to reduce production costs more than 50 per cent, reports the Stainless Processing Div., Wall Colmonoy Corp., Detroit.

The alloy, a special nickel-base material called Nicrocoat No. 3, is applied by cold spraying. The coating is 0.001 to 0.0015 in. thick. (Close control of thickness is a feature of the process.) The shaft is then placed in a controlled atmosphere furnace where the overlay is fused to it with a molecular bond.

Originally, the part was machined from stainless steel. To reduce costs, attempts were made to buttweld carbon steel to a stainless steel stubshaft section. The technique was unsatisfactory because of critical torsional requirements. The shaft is now fabricated entirely from mild steel.



Takes the wrench out of the quench!



AT TOP: 2,500 ton pressure quench using 24,000 gpm of water. For 172" wide x 3" thick maximum plate. Transfer car in foreground.

ABOVE: Plate at hardening temperature in pressure quench prior to closing the platens.

DREVER PRESSURE QUENCH KEEPS PLATE FLAT WHILE UNIFORMLY QUENCHING WITH THOUSANDS OF JET SPRAYS

While as many as 35,000 water sprays quick quench the steel plate, the Drever Quench holds it under pressures up to 2500 tons through the use of ribbed platens. The result? High uniformity of quench and a flat plate, and usually, the elimination of any further levelling operations.

PIONEERING ENGINEERING IN THE QUENCH OPERATION

As an important component of the Drever Plate Heat Treating Lines, Drever Quenches handle plate up to 172" wide x 3" thick and 45' long in fully automatic operation. Designed for versatile operation too, a wide variety of product mix can be quenched as well as plate from both the hardening and tempering furnaces.

DREVER ENGINEERING FOR YOU

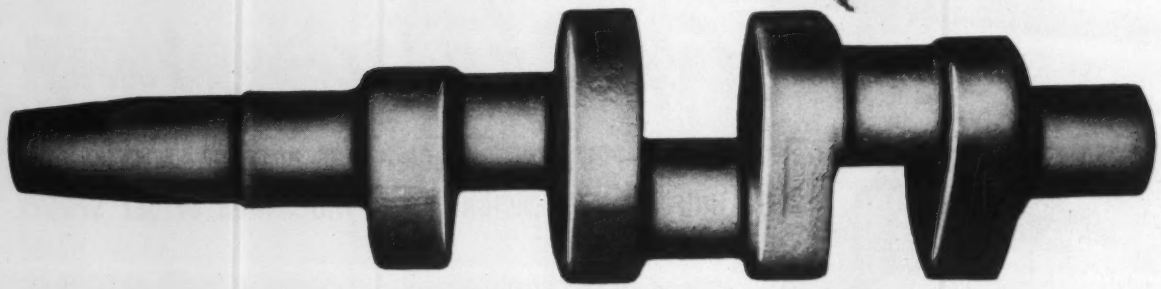
Drever engineering has contributed to the advancement of production rates and quality standards in every phase of the heat treating process for both large and small operations. In furnace design, in associated processes, in handling equipment Drever engineering staff has a wealth of experience which can be applied to your requirements. Drever Company, Bethayres, Pa. Phone: WI 7-3400.

DREVER INDUSTRIAL FURNACES

ENGINEERED TO YOUR PARTICULAR REQUIREMENTS

ENGINEERING AND MANUFACTURING FACILITIES AROUND THE WORLD THROUGH ASSOCIATES IN FRANCE, GREAT BRITAIN, GERMANY, ITALY AND JAPAN

park re-design technique cuts costs 54%



In close co-operation with a pump manufacturer, Park engineers re-designed the unit to fit the customer's requirements. Result: This die-forged crankshaft came through 28% lighter . . . no sacrifice in strength or quality.

It's possible that Park's facilities and techniques can do things like this for you. Why not call us and find out?

the park drop forge co.

777 East 79th St., Cleveland 3, Ohio

pf

3028-PD

Tests Shed Light On Flame Spraying

EFFECTIVE FLAME spraying of alumina on metal is significantly influenced by the condition of the surface, the velocity of the spray, the temperature of the particles and their cooling rate, reports the National Bureau of Standards. It did the work for the Air Force.

Alumina was applied with two types of oxyacetylene guns. One, charged with alumina powder, has a velocity of 145 feet per second. The other, charged with a sintered alumina rod, has a velocity of 566 fps.

• **Adhesiveness**—The rougher the metal's surface, the stronger the bond. Metal strips were roughened to various degrees and mounted between two knife edges with 0.05 in. of each strip projecting beyond the blades.

The projecting portion was sprayed to a thickness of 0.10 ± 0.002 in. The force required to strip the coating determined the strength of the bond.

Result: Bond strength grew progressively greater as the surfaces increased in roughness. In addition, bond strengths of coatings made with the rod gun were greater than those made with the powder gun.

• **Temperature**—Particles that are completely molten at the time of impact adhered more readily than those which were partially molten. In the test, it was determined that particles fired at 2 in. from a powder gun were molten only on the outside; at 4 in. practically all the droplets were molten; and at 6 in. only the cores were molten. The rod gun particles flowed more on impact than the powder gun particles did.

• **Cooling Rate**—Thermal properties of the material influence the flow of molten particles immediately following impact.

When a particle strikes glass, it cools less rapidly than on metal, allowing more time for a chemical bond to form; the bond formed between flame spraved alumina and metals is principally mechanical in nature.

Burnishing Rollers Lead Double Life

Rollers are positioned opposite each other

Four burnishing rollers are shown working both ends of railroad car axle. The set, left, has produced 7400 axles since its installation over a year ago

AFTER PRODUCING more than 7400 railroad car axles, burnishing rollers are reground and put back into service at the St. Louis plant of the American Car & Foundry Div., ACF Industries Inc.

The rollers burnish axle end collars, journals, and dust collars to a 7 microinch finish.

ACF uses $8\frac{1}{2}$ in. diameter burnishing rollers with a hardness of Rockwell C 53-55 and a 4-rms finish. Each roller can be reground until its diameter gets down to 8 in.

The alloy used (No. 19) is produced by Haynes Stellite Co. (Kokomo, Ind.), a division of Union Carbide Corp. The material is nonmagnetic.

To finish the axles, a machine equipped with four rollers burnishes both ends simultaneously. An average of ten axles can be produced per hour. The rollers turn at 217 rpm and are set for $8\frac{1}{2}$ in. per minute crossfeed. Most production runs involve a $5\frac{1}{2}$ in. by 10 in. journal area. Some work is done on 6 by 11 in. journals.

For parts DIRECT from machining to assembly.. dependably

NO HEAT TREATING REQUIRED with

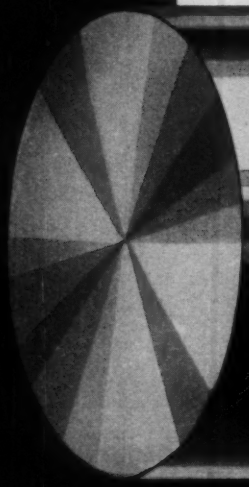
La Salle e.t.d. 150

elevated temperature drawing

ALLOY STEEL BARS

GUARANTEED 150,000 PSI tensile strength

- e.t.d. 150 alloy machines better than heat treated in-the-bar alloy steels!
- e.t.d. 150 alloy has exceptional uniformity!
- e.t.d. 150 alloy simplifies production!



Quality and Cost-reducing Advantages!

(1) Heat treating with its attendant costs and hazards is eliminated. (2) No quench cracks or distortion due to heat treating. (3) Machinability is greatly improved by the acicular pearlitic-ferritic structure. (4) Tool life and finish are excellent. (5) Production is simplified . . . secondary operations following heat treat are eliminated. (6) Part quality, uniformity and reliability are maintained or improved. (7) End cost is greatly reduced.

Ask for a sample test bar

Send a blueprint . . . or write us giving application details.

What is e.t.d. 150 alloy?

"e.t.d." 150 is an alloy steel bar made by the exclusive and patented Elevated Temperature Drawing process to a guaranteed minimum tensile strength of 150,000 psi and a hardness of Rc 32 minimum. Strength and hardness are uniform across the section of the bar. The uniform pearlitic-ferritic structure of "e.t.d." 150 alloy eliminates the problems associated with non-uniform quenched and tempered structure. Ideal for shafts, gears, pinions, fasteners and other parts now being heat treated or made from heat treated in-the-bar materials.

SPECIFICATIONS

Ultimate Tensile Strength	150,000 psi minimum*
Yield Strength (.2% offset)	130,000 psi minimum*
Proof Stress (.01% offset) (1½" Rd. and smaller only)	120,000 psi minimum*
Elongation—Approx. only	10% -20%
Reduction of Area—Approx. only	35% -45%
Brinell Hardness Number	302 minimum*
Rockwell "C" Hardness	32 minimum*

*GUARANTEED MINIMUMS. In event of disagreement between hardness and tensile strength, the tensile strength shall govern.

Use this coupon to ask for helpful data bulletin

La Salle STEEL CO.
1414 150th Street
Hammond, Indiana

Please send Helpful Data Bulletin No. 22, "e.t.d. 150 alloy steel bars eliminate heat treating of parts."

Name_____

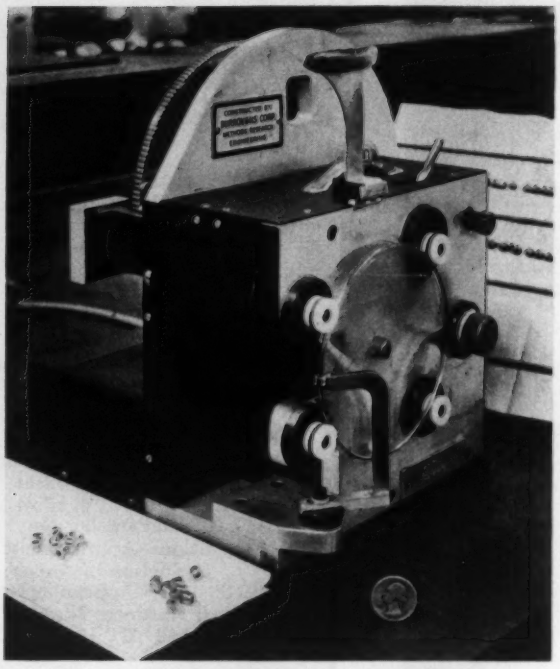
Title_____

Company_____

Address_____

City_____ Zone____ State_____

Magnet wire, coated with polyurethane, is spun into long, springlike shapes. They'll be inserted in the shuttles, then wound on tiny cores for memory cells to be installed in computers



The circular shuttle (with the wound wire spring inside) spins through the center of the toroidal core, winding the wire in predetermined patterns on the core for assembly in pin blocks

Assembly of Tiny Memory Cells

FACED with the problem of increasing production and cutting the cost of miniaturized memory cells called Bi-mags, Burroughs Corp., Detroit, redesigned the part and developed its own machines to speed assembly.

Result: Unit cost dropped from $4.73 to $1.51. Production zoomed from 2000 to 16,000 parts a week.

The cell is a bimetallic, magnetic memory core about ¾ in. in diameter. About 960 of them are used in each computer unit Burroughs makes for defense communications equipment. Each can store and release one memory impulse.

• The new design eliminated hand winding.

When Burroughs first started the job, inner cores (stainless steel bobbins about the size of the erasers on pencils) were wound by hand with cut lengths of wire.

Each minute wire lead had to be tagged so women operators could match them with correct connecting pins. The contact pins were inserted into the case by hand. Leads were soldered individually to each pin. Finished units were marked with a semiautomatic, hand press. Testing was complicated and time consuming. It sometimes took 5 minutes to check a single unit.

• The redesigned unit has three parts.

The inner core remains unchanged. It's wound with permalloy, magnetic tape and inserted into an injection molded, nylon jacket which is then sealed.

All of the pins are now molded into a pin block, obviating hand insertion of each pin into the case.

The third part, the outer case, is about ½ in. high by ¾ in. square. Cases are automatically compression molded from powdered bakelite in a 16 cavity press at Burroughs' Plymouth, Mich., plant. They're later stamped and numbered on an automatic machine.

• On one group of special machines designed by Burroughs, coils are wound with No. 36 solderable magnet wire coated with polyurethane.

The wire is first spun into a long spring shape.

The "springs" are just under ⅛ in. in diameter, about 11 in. long. They are loaded into a circular shuttle, about 6 in. in diameter,

The operator connects the lead wires from the coil to the pin blocks in one of 94 patterns. The fixture then is swung over, dipping the connections into the solder bath

In final inspection, the operator watches an oscilloscope screen, checking each of the memory cells for amplitude, switching time, and flux content. Each cell must have 100 per cent reliability

Speeded by Specials

made of ⅛ in. ID steel tubing. The shuttle mounts on the coil winder where, by running through the center of the toroidal coil, it winds the coil wire in predetermined patterns.

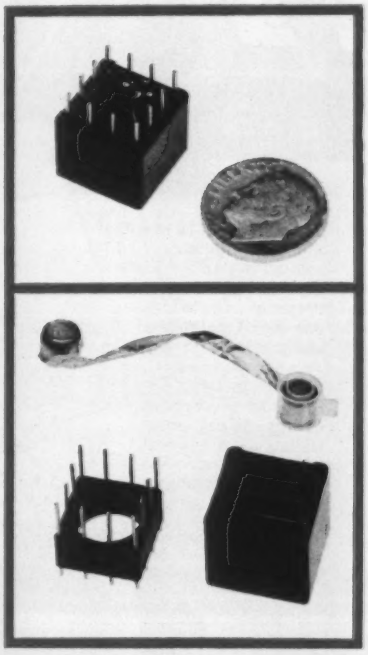
After the cores are wound, they're dropped into the pin blocks and the lead wires are hand connected to the pins, following one of 94 patterns. All connections are dip soldered. Assembled pin blocks are set into the bakelite cases that are already stamped and numbered. The finished unit is potted by filling it with an epoxy mixture (measured automatically) which seals and insulates the Bi-mag.

• Since Burroughs must have 100 per cent reliability on these parts, the Bi-mags are given a preliminary test before they are potted.

The test determines whether or not: 1. The cores have been wound correctly. 2. The lead wires are fastened to the proper pins. Failures are turned back to a rework bench where they're rewound and resoldered.

Completed Bi-mags are tested on another electronic gage the company developed. It checks them for amplitude, switching time, and flux content. The operators can tell from watching oscilloscopes which units meet all reliability tests. Testing now takes less than a minute per part.

• If you'd like to have a copy of this article, write to Editorial Service, STEEL, *Penton Bldg., Cleveland 13, Ohio. You may win $1000 by using material like this in* STEEL. *For details, see the Servicenter, Pages 5 and 6.*



This is one of the tiny Bi-mag memory units used in computers—the dime shows relative size. By redesigning the unit as three separate elements, Burroughs engineers made it possible to automate some of the operations

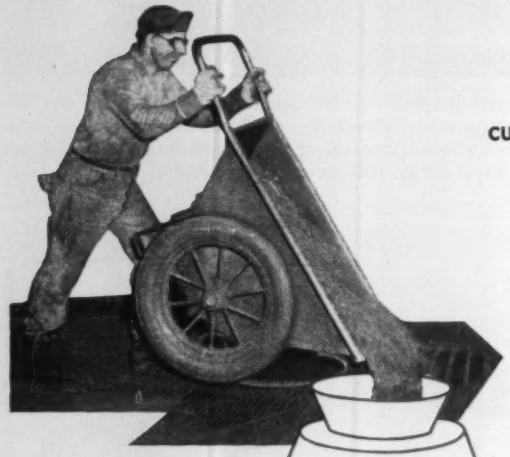
SAVE $36.00 a ton on cast iron chips

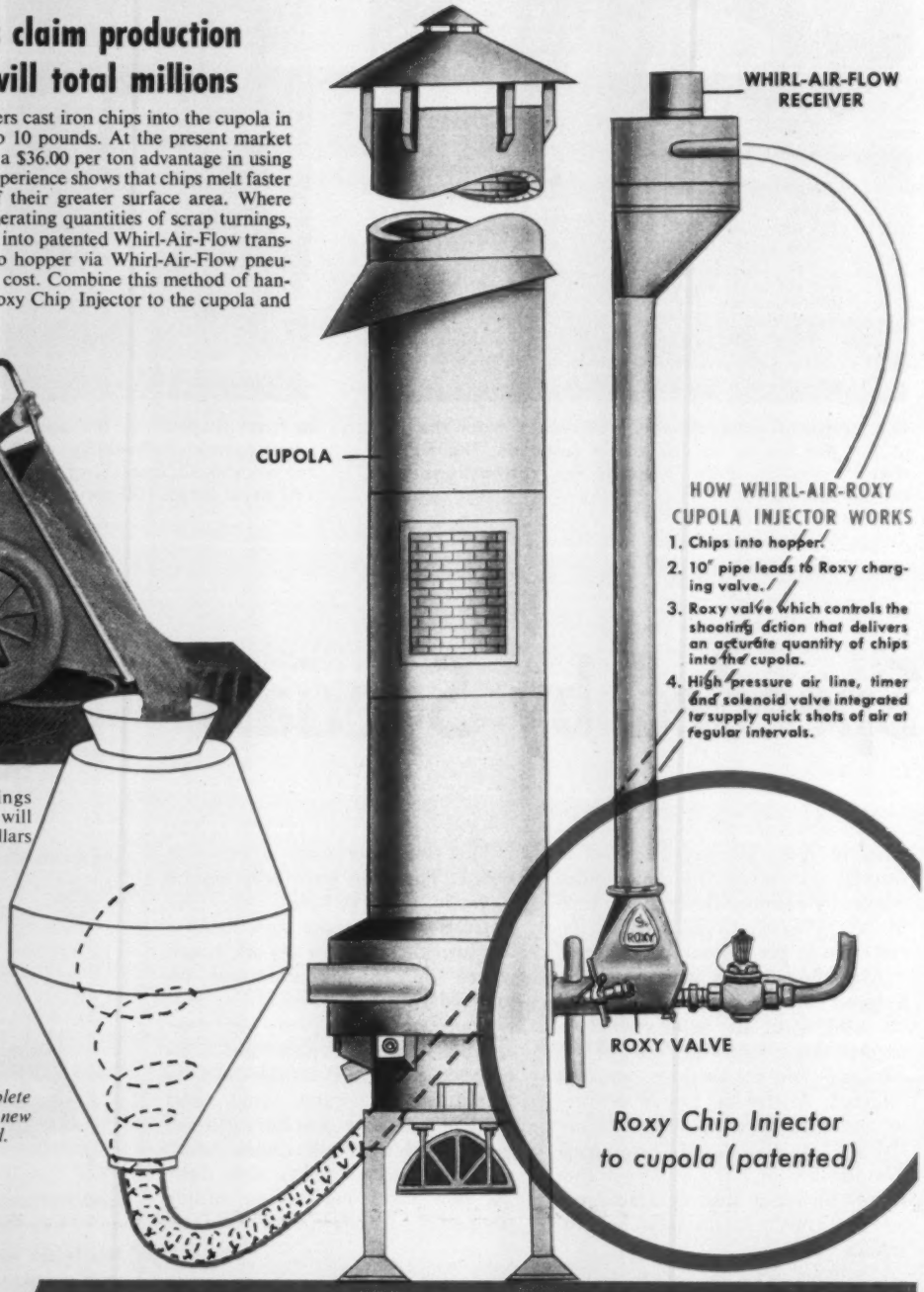
New Whirl-Air-Roxy method delivers chips from Machine Shop to Cupola *(patented)*

Foundries claim production savings will total millions

New Roxy valve delivers cast iron chips into the cupola in measured shots of 7 to 10 pounds. At the present market value of scrap there is a $36.00 per ton advantage in using chips. Also, foundry experience shows that chips melt faster than scrap because of their greater surface area. Where machine shops are generating quantities of scrap turnings, they can be discharged into patented Whirl-Air-Flow transporter and delivered to hopper via Whirl-Air-Flow pneumatic conveyor at low cost. Combine this method of handling chips with the Roxy Chip Injector to the cupola and you will achieve savings that foundrymen say will amount to a million dollars in very few years of operation. The Whirl-Air-Roxy method is easily applied to any size foundry; small, medium or large. Initial cost is low and savings will pay for installations in a period of a few months. We invite your exploratory inquiry.

Write or wire for complete information on the new Whirl-Air-Roxy method.




WHIRL-AIR-FLOW RECEIVER
CUPOLA
HOW WHIRL-AIR-ROXY CUPOLA INJECTOR WORKS
1. Chips into hopper.
2. 10" pipe leads to Roxy charging valve.
3. Roxy valve which controls the shooting action that delivers an accurate quantity of chips into the cupola.
4. High pressure air line, timer and solenoid valve integrated to supply quick shots of air at regular intervals.
ROXY
ROXY VALVE
Roxy Chip Injector to cupola (patented)

WHIRL AIR FLOW PNEUMATIC CONVEYORS

WHIRL-AIR-FLOW

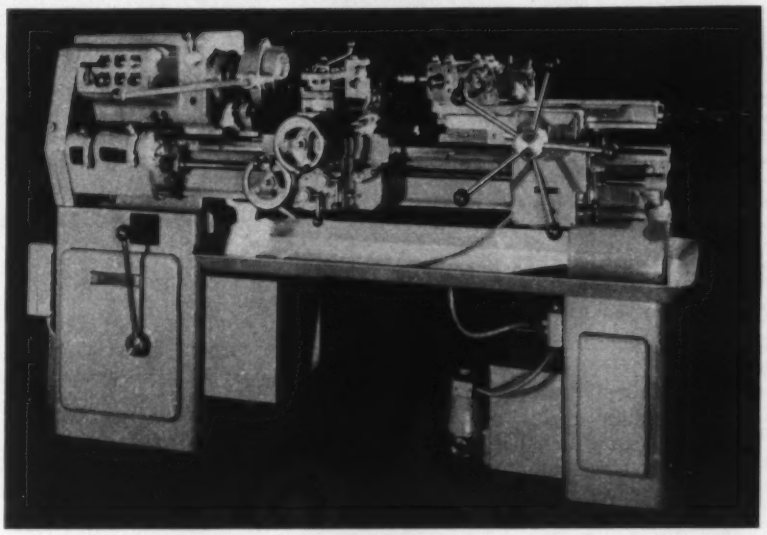
514 25th Avenue S. E., Minneapolis 14, Minn. • Fillmore 9-2221

Ram Type Turret Lathe Can Do Chucking, Bar Work

IN ADDITION to standard turret operations, Sheldon's Model 3R lathe is equipped for turning between centers and single point threading. The universal, ram type unit is designed as a low cost, all purpose production tool.

Bar capacity is 1½ in., swing over bed ways is 15 in., and the swing over the cross slide is 8 in. With those clearances, chucking and bar work are possible. The ram turret has six working stations. A power feed box on the turret increases accuracy and finish of machined parts. Power feeds are engaged electrically by pushbuttons.

For further information, *write* Sheldon Machine Co. Inc., 4258 N. Knox Ave., Chicago 41, Ill.



Rotary Unit Mills Two Parts at One Time

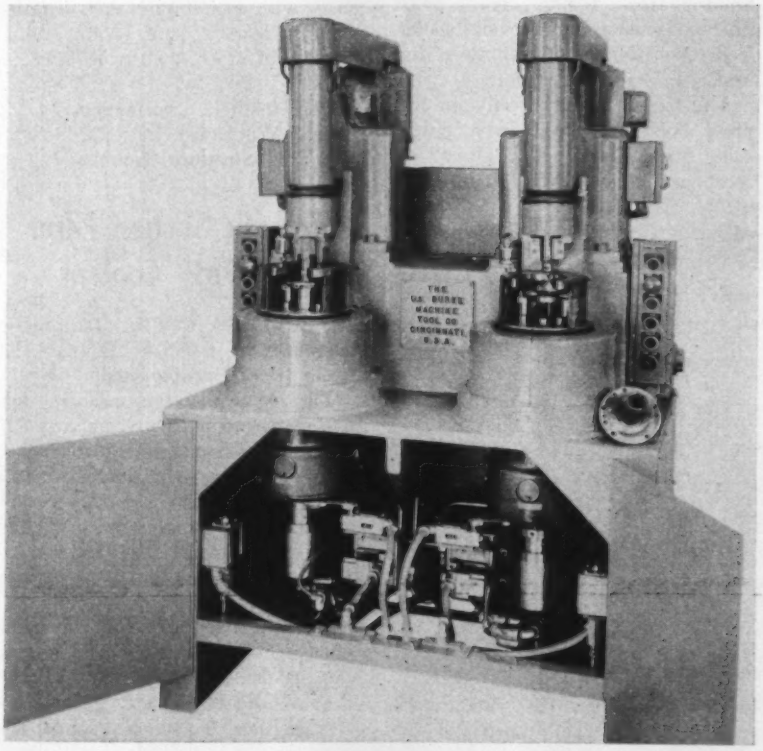
CIRCULAR grooves are milled to precise, preplanned, tapered depths on the U. S. Half-Mill. The unit handles two parts (pump units for automatic transmissions) simultaneously.

Operation: The pieces are held on independently powered, rotary tables by air actuated, elevator type, clamps. The tables rise until the parts hit locators and start the automatic cycle. Release at the end of the cycle is also automatic (after the clamp descends with the part).

The power feed tables revolve at 2 rpm. As the parts rotate, the cutter (a carbide end mill) rises and falls to mill the oil grooves.

A rise and fall cam bolted to the periphery of each table helps assure precision. An air cylinder forces the quill down so a roller guide attached to the quill stays in constant contact with the cam. A brush with a drip oiler precedes the cam follower to keep the cam surface clean.

Motors drive the rotary tables through speed reducers. Both spindles are powered by independent



motors with flat belt drives producing a fixed speed of 6000 rpm. The compact unit is in operation at an automobile plant.

For further information, *write* U. S.-Burke Machine Tool Div., Cincinnati Mfg. Corp., Brotherton Road at Pennsylvania R. R., Cincinnati 27, Ohio.

Roll Feeds Are Added To Press Accessory Line

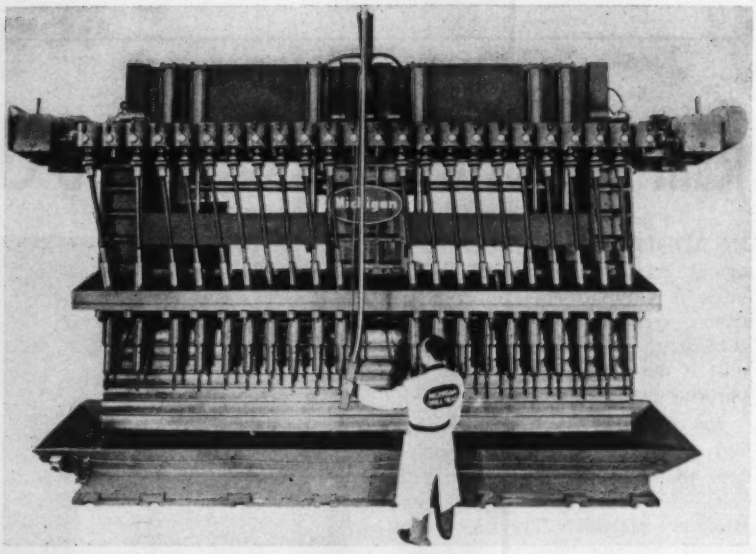
ROLL feeds designed for high speed automatic punch press operation have been added to the Cooper Weymouth accessory equipment line.

Roller or ball bearings are used for all rotating parts. The lower roll rotates in sealed ball bearings which do not need lubricating. The roll feeds have a top roll release with a lockout device. The top roll is automatically reset by a starting key that is actuated by the downward movement of the press ram.

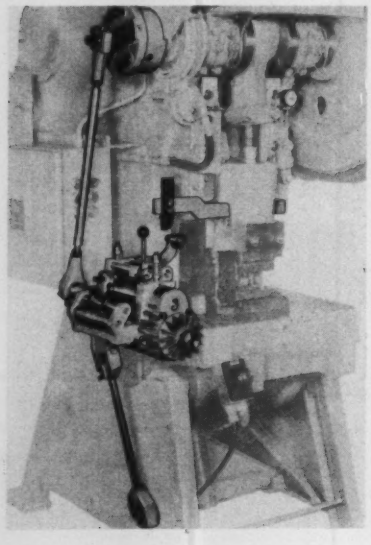
The unit features a high speed disc brake that has double the usual braking area. It's air cooled by a fin type housing and provides cooler feed operation and less time for brake lining replacement.

The feeds mount directly on the press bolster to feed from either side, front or back. Direct or compound geared drives (the latter feeds longer than rated lengths) are available. They come in 14 sizes with maximum feed lengths ranging from 2½ to 12 in. and a variety of stock widths from 4 to 12 in.

For further information, *write* Cooper Weymouth Inc., 600 Honeyspot Rd., Stratford, Conn.



DESIGNED TO DRILL RAILROAD RAILS AND FROGS, this vertical, multiple spindled, hydraulic machine has 24 upper, individual drives. It's called the "Michigan Railroader." It drills any desired hole pattern (forward, back, right, left) or to adjustable depths. It's 16 ft long and 13 ft high; has a 16 ft, hydraulic, rail feed, universal joint; three column drills; and a T slotted, face plate. The unit has 24 in. of maximum slide travel with hydraulic counterbalance for the machine slide. An equalizing rack bar guides the platen. For further information, **write** Michigan Special Machine Co., Warren, Mich.



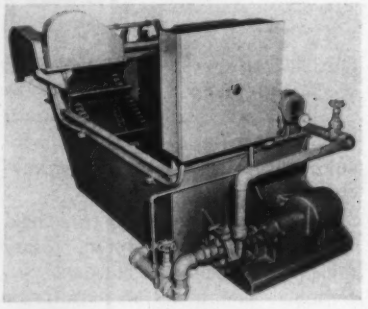
Automatic Suction Filter Screens Dirty Coolant

A SELF-CLEANING, automatic suction filter is said to eliminate the need for replaceable media.

Dirty coolant is pumped through a screen into a clean compartment for re-use. Swarf, metal particles, dirt, and other particles collect on top of the screen forming a mat which filters progressively to low micron particle size.

As the mat becomes deep enough to decrease the flow of filtered coolant, a switch starts the conveyor. That moves the mat, clears a portion of the screen, and restores the flow of filtered coolant.

The filter is available in capacities from 25 to 2500 gpm. The machines can be tailored to specific needs, adapted to central systems, and installed above or below floor level.



For further information, *write* Henry Mfg. Co., 529 E. Reed St., Bowling Green, Ohio.

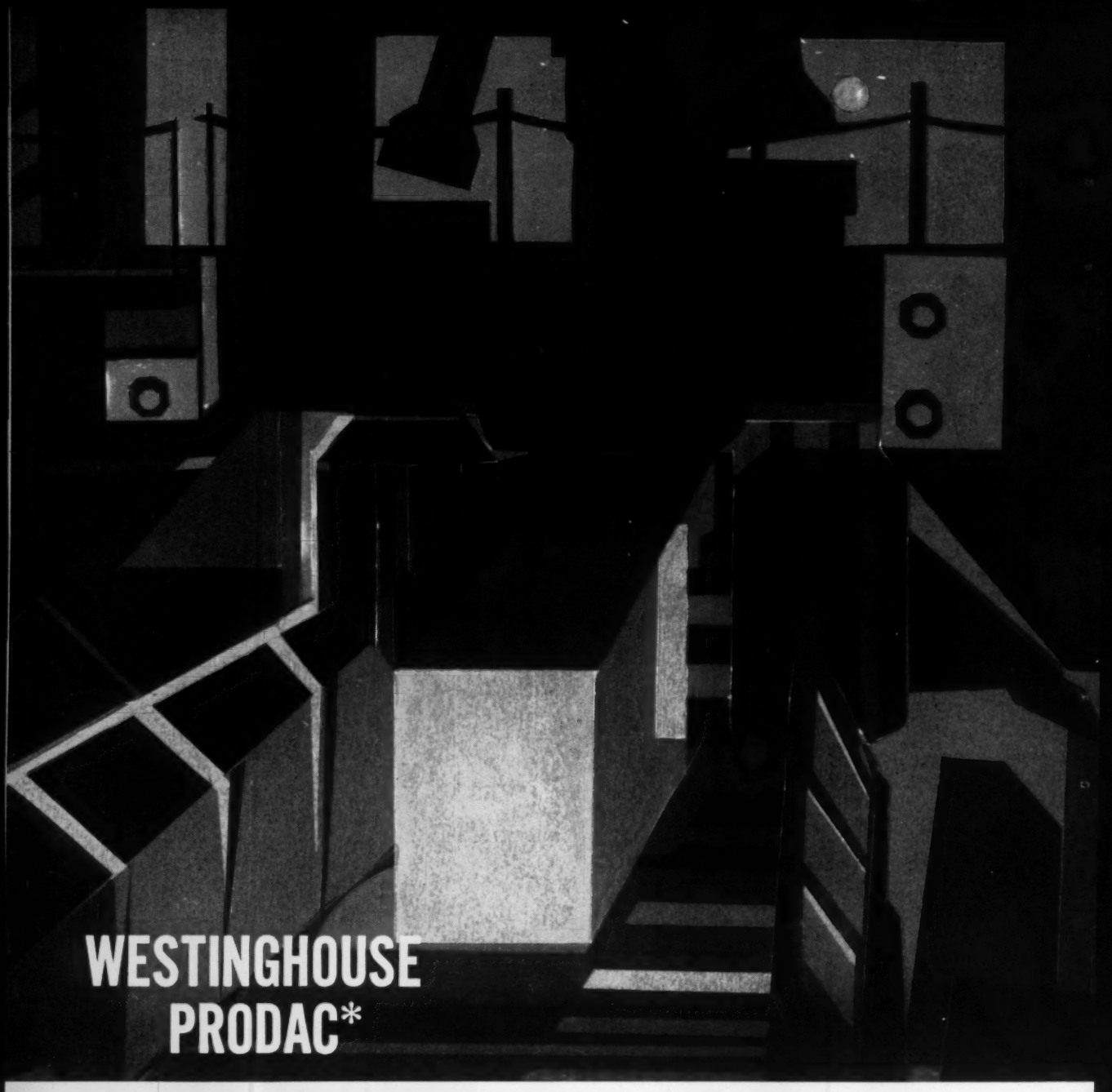
Fan Cooling Optional on Enclosed Gear Motor

A COMPACT, enclosed, gear motor with the field mounted directly behind the gear housing has been brought out by Brevel.

The motor has output speeds from

MORGAN CONSTRUCTION COMPANY WORCESTER, MASS.

ROLLING MILLS • MORGOIL BEARINGS • WIRE MACHINERY • REGENERATIVE FURNACE CONTROL • EJECTORS • GAS PRODUCERS



means automatic cycling of blooming mills

. completely coordinated positioning of horizontal rolls and manipulators automatic operation of the fingers . . properly sequenced operation of the tables and feed rolls . . . precisely controlled timing of the start, stop, reverse and run of the main drive. This is but one of the many ways Westinghouse PRODAC† is helping bring about "the mill of the future" today through completely automatic cycling of blooming mills.

Westinghouse has service-proven PRODAC installations that economically automate slabbing mills, ingot buggy operations, reversing roughers, stock house materials handling and many other mill applications.

By specifying Westinghouse PRODAC for your mill, you open the door to many new cost-saving benefits which are unobtainable with conventional controls. For example, PRODAC assures the most consistent standards of quality control at the highest rates of production speed . . . coordinates operation of all machines at the over-all maximum efficiency . . . holds maintenance to a minimum and practically eliminates control failures . . . gives you a "building block" design which provides flexibility required for further mill automation.

The entire team of Westinghouse PRODAC engineers is at your service to help you determine exactly where and how PRODAC can benefit you. Your Westinghouse sales engineer can give you complete information, or write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-22112

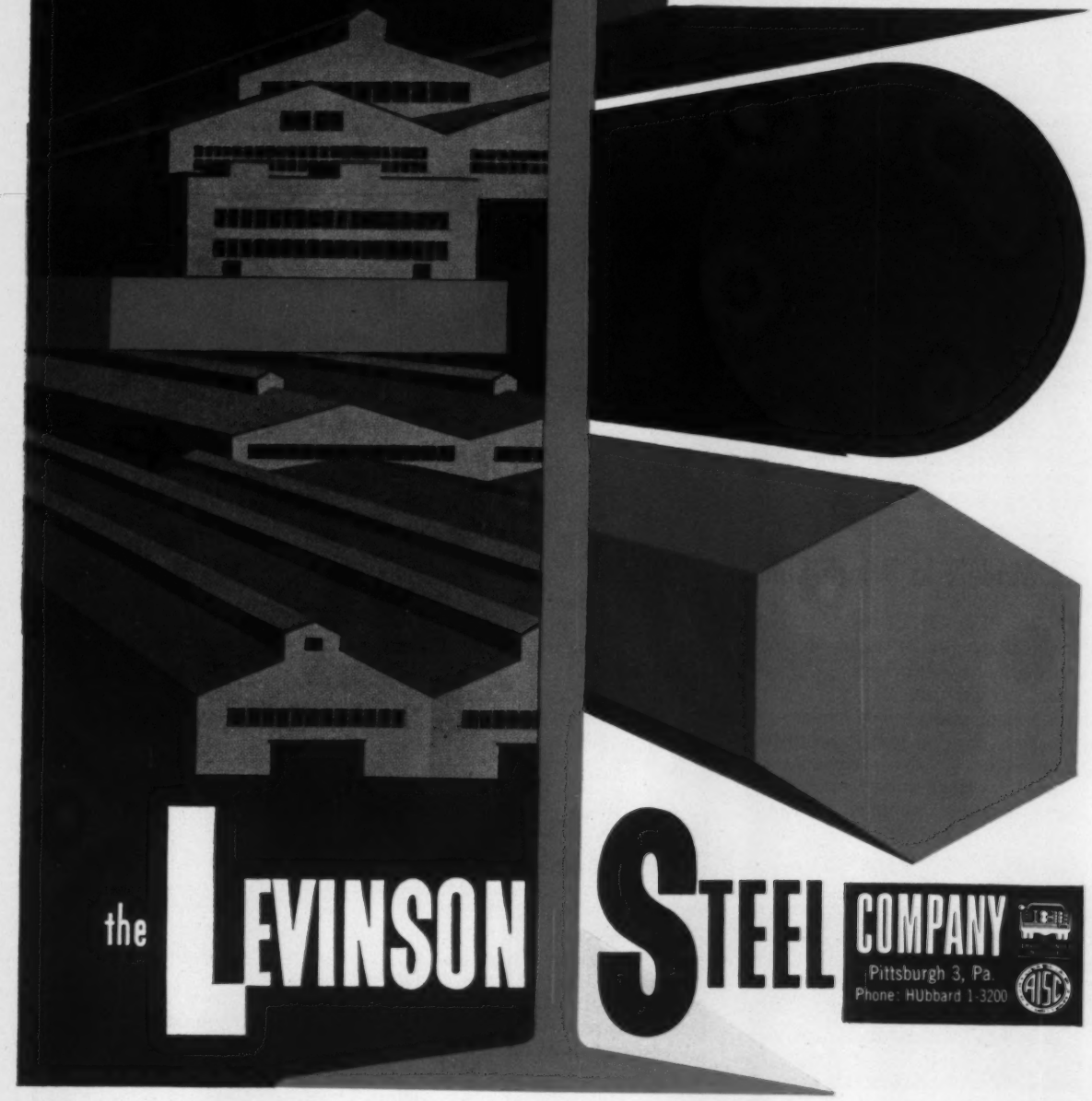
†Trade-Mark

YOU CAN BE SURE...IF IT'S Westinghouse

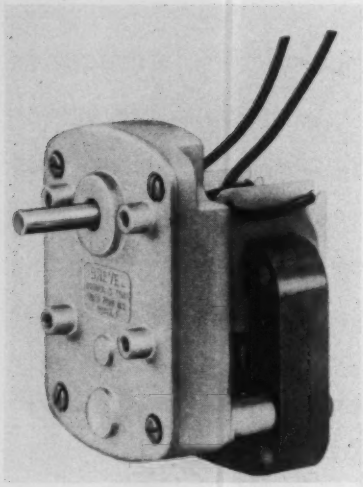
*PROGRAMMED DIGITAL AUTOMATIC CONTROL

Dealers in American made steel
for over half a century

WHEN YOU NEED STEEL CUT TO SIZE OR FULLY FABRICATED YOU CAN DEPEND ON LEVINSON. THOUSANDS OF COMPANIES HAVE LEARNED TO RELY ON LEVINSON FOR 58 YEARS WITH FULL ASSURANCE THAT THEIR STEEL WILL BE DELIVERED AS SPECIFIED AND ON TIME.



the LEVINSON STEEL COMPANY
Pittsburgh 3, Pa.
Phone: HUbbard 1-3200
AISC



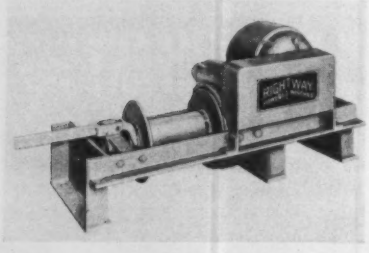
6 to 120 rpm with output running torque of 12 in.-lb at 6 rpm for continuous duty. It can be geared for a variety of speeds higher and lower than standard, and wound for higher torques at intermittent loads. Its nylon bobbin has undergone Underwriters' Laboratories tests for temperatures up to 248° F. External cooling fans are available where more torque is needed with limited temperature rise. A brake or clutch may be built in without increasing dimensions.

For further information, *write* Brevel Products Corp. 639 W. 26th St., New York 1, N. Y.

24 Models in Winch Line

RATINGS from 500 to 30,000 lb are available in 24 standard models of winches with electric, air, gasoline, or hydraulic power.

Standard and custom models are made to requirements from interchangeable standard components. The all weather units feature quality gear reductions in oil bath, automatic mechanical load brakes, and free spooling drums.



For further information, *write* Stanspec Corp., 2138 Lee Rd., Cleveland 18, Ohio.

Cam Index Table Drive Handles High Thrust

THE EXPERT cam drive can be used to index tables subject to high thrust or radial loading on trunnion and dial type automated machines, stationary center column machines, and special machine tools.

The drive is completely sealed, has excellent stability, and comes with a follower plate thrust rating exceeding 31,000 lb and a tipping moment rating of 380,000 in.-lb.

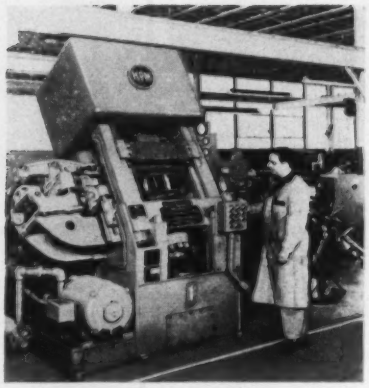
An X-type bearing design takes loads in all directions and permits maximum thrust and radial load ratings. The periphery design also allows an open center for utility connections or for stationary center column machine applications. You

can get standard index drives of this type with an integral gear reducer for tables from 20 to 120 in. in diameter.

For further information, *write* Expert Automation Machine Co., 17144 Mt. Elliott Ave., Detroit 12, Mich.

Hydraulic Press Produces 0.0005 in. Edge Accuracies

A TRIPLE action, hydraulic press blanks most types of metal up to ¼ in. with smooth edge accuracies within 0.0005 in. The press is automatic and all actions are synchronized. Pressures for the three actions are easily adjusted for various types of metal.



The blanking punch works against a bottom punch or die cushion and a third action clamps the material firmly during the blanking stroke. The press cycles over 100 strokes a minute.

For further information, *write* Hydraulic Press Mfg. Co., a division of Koehring Co., Mt. Gilead, Ohio.

Furnace Processes Parts In Atmosphere or Vacuum

SMALL parts can be processed in a vacuum or protective atmosphere with the Lindberg packaged unit.

The package consists of a furnace equipped with electrical components and an automatic controller; a 4 in. ID alloy retort for operation up to 2250° F at a vacuum level of 0.5 micron; and a vacuum pumping system with controls and vacuum gage.

For further information, *write* Pilot Plant Equipment Div., Lindberg Engineering Co., 2444 W. Hubbard St., Chicago 12, Ill.

Epoxy Adhesive Resists Acids and Alkalies

DESIGNED primarily for high speed production, an epoxy adhesive requires no mixing or metering and maintains a six month minimum shelf life at room temperature.

The material (called Meta-Bond 331) bonds metals, glass, ceramic, and most plastics. Shear strength of aluminum-to-aluminum bonds exceeds 3000 psi. The adhesive is stable at room temperature yet cures in 150 minutes at 250° F or 15 minutes at 350° F.

It resists most acids, alkalies, and

ACT

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ACT (Application Consulting Team) has been created out of the merger of Mexico Refractories and Kaiser Refractories to help the steel industry profit fully from this outstanding fact.

Recent technical developments have given modern refractories such high performance potentials that proper selection and use is now as important to economy and efficiency as the technical developments themselves.

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Over 100 ACT sales engineers are ready now to work with you directly, to answer an immediate problem or to plan toward a desired future improvement. Your sales engineer, in turn, will call as needed upon the specialized services of three groups of ACT specialists: (1) Industry Engineering Group—experienced in customers' industries . . . to help evaluate needs for your particular operation; (2) Application Development Group—specialized in up-to-date refractory application techniques . . . to bring you survey, selection, drawings and installation assistance; (3) Refractory Research Group—30-year pioneers of major advancements in modern refractories.

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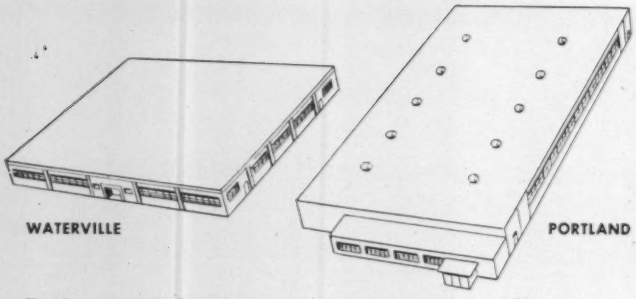
City_____ State_____

WHICH NEW PLANT IS BEST FOR YOU?



Both are modern, one story masonry buildings community financed by the citizens of Portland and Waterville, Maine, for industrial use. Utilities supplied.

BOTH ARE FOR SALE, LEASE, OR LEASE PURCHASE, AT LESS THAN $6.00 PER SQ. FT. ON CURRENT ESTIMATES. EITHER CAN BE COMPLETED TO BEST SUIT YOUR FIRM'S REQUIREMENTS. NOW, LOOK AT THESE IMPORTANT FACTS:

	WATERVILLE	PORTLAND
Building Size	30,000 sq. ft.	48,000 sq. ft.
Lot Size	7.5 acres	10 acres
Park Size	85 acres	150 acres
Turnpike	Attached	¼ mile
Airport	1 mile	Attached
College	¾ mile	2 miles

100% NON-PROFIT FINANCING AVAILABLE

There is a dependable labor supply in both cities; both are within a 450 mile radius of 60% of the U. S. and Canadian population. Both provide liveability, one by the seacoast, the other in the heart of Vacationland. Make your choice of the plant that best suits your requirements in the state that offers you a great deal.

Confidential inquiries will be processed promptly.

Maine Department of Economic Development

STATE CAPITOL AUGUSTA, MAINE

solvents. It can safely be used at operating temperatures of −94 to 347° F. The material is internally resilient, and thermal shock does not produce cracking.

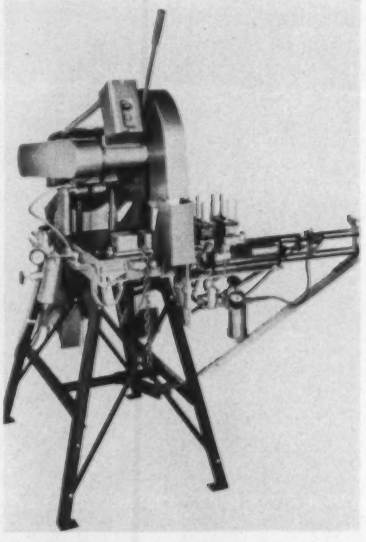
For further information, *write* Mereco Products Div., Metachem Resins Corp., 530 Wellington Ave., Cranston 10, R. I.

Automatic Machine Cuts 1¼ in. Solid Stock

TUBING, extruded shapes, and bars (ferrous and nonferrous) can be handled by a 14 in., air operated, automatic cutoff unit.

It will cut most shapes to 3 in. in standard bar lengths and solid stock to 1¼ in. Feed stroke is variable from 3/16 to 8 in.

The machine features quick setup for semiautomatic or automatic cycling and can be used for short run and maintenance type cutting. The V design work feed jaws are air powered.

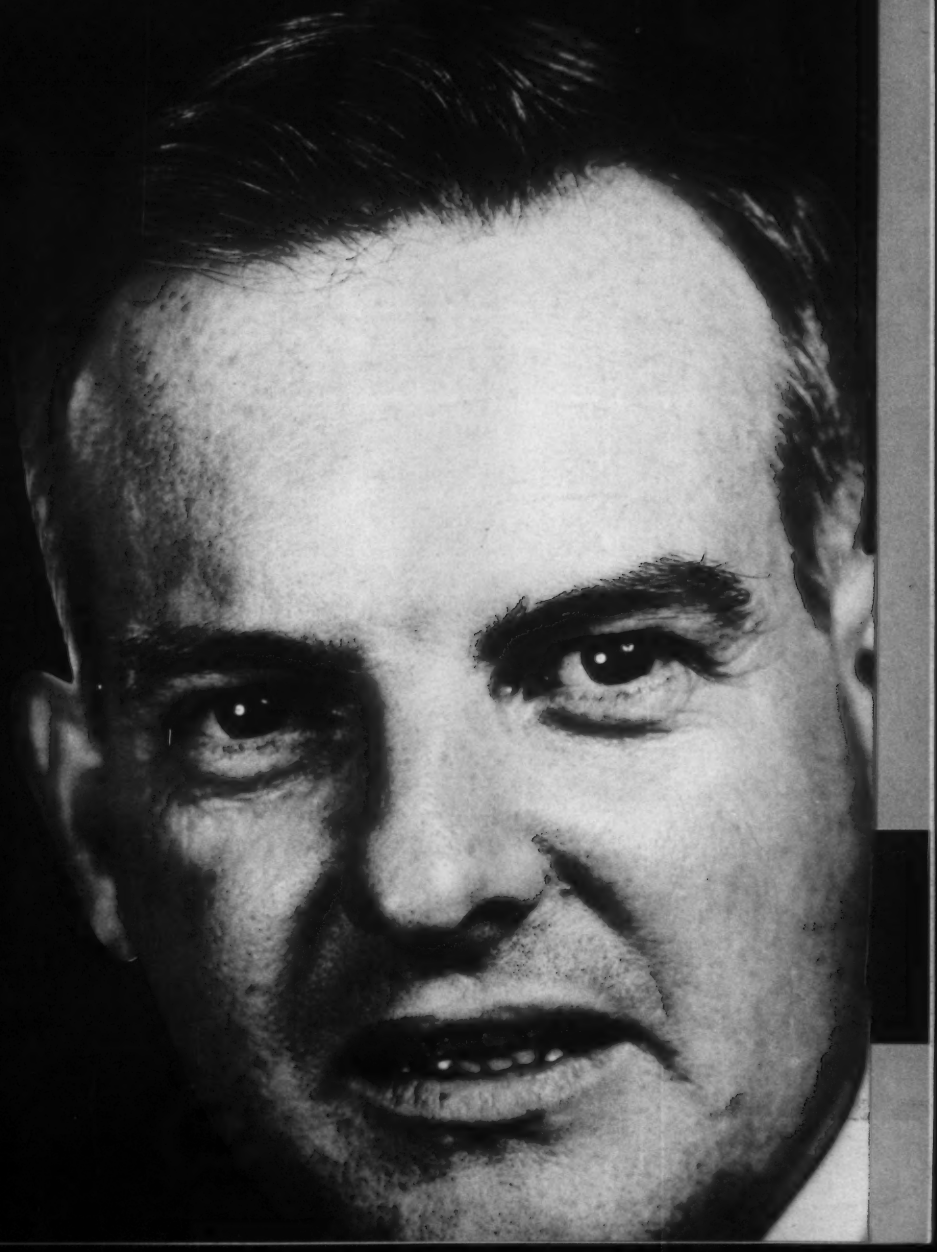


The 14 in. wheel travels at 3000 rpm. Spindle diameter is 1 in. The unit requires 10 to 100 psi of air and averages 2½ to 4 cu ft a minute on continuous duty. The spindle drive motor is rated at 5 hp (220/440 volts, 3 phase).

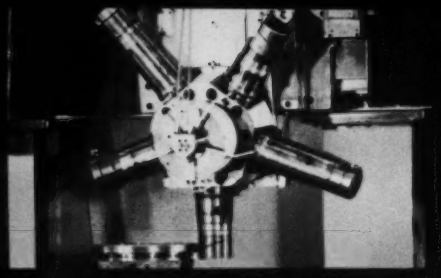
For further information, *write* Industrial Products Div., Cleveland Pneumatic Industries Inc., 2415 N. Burdick St., Kalamazoo, Mich.

"WE'RE USING TAPE-CONTROLLED MACHINE TOOLS . . .

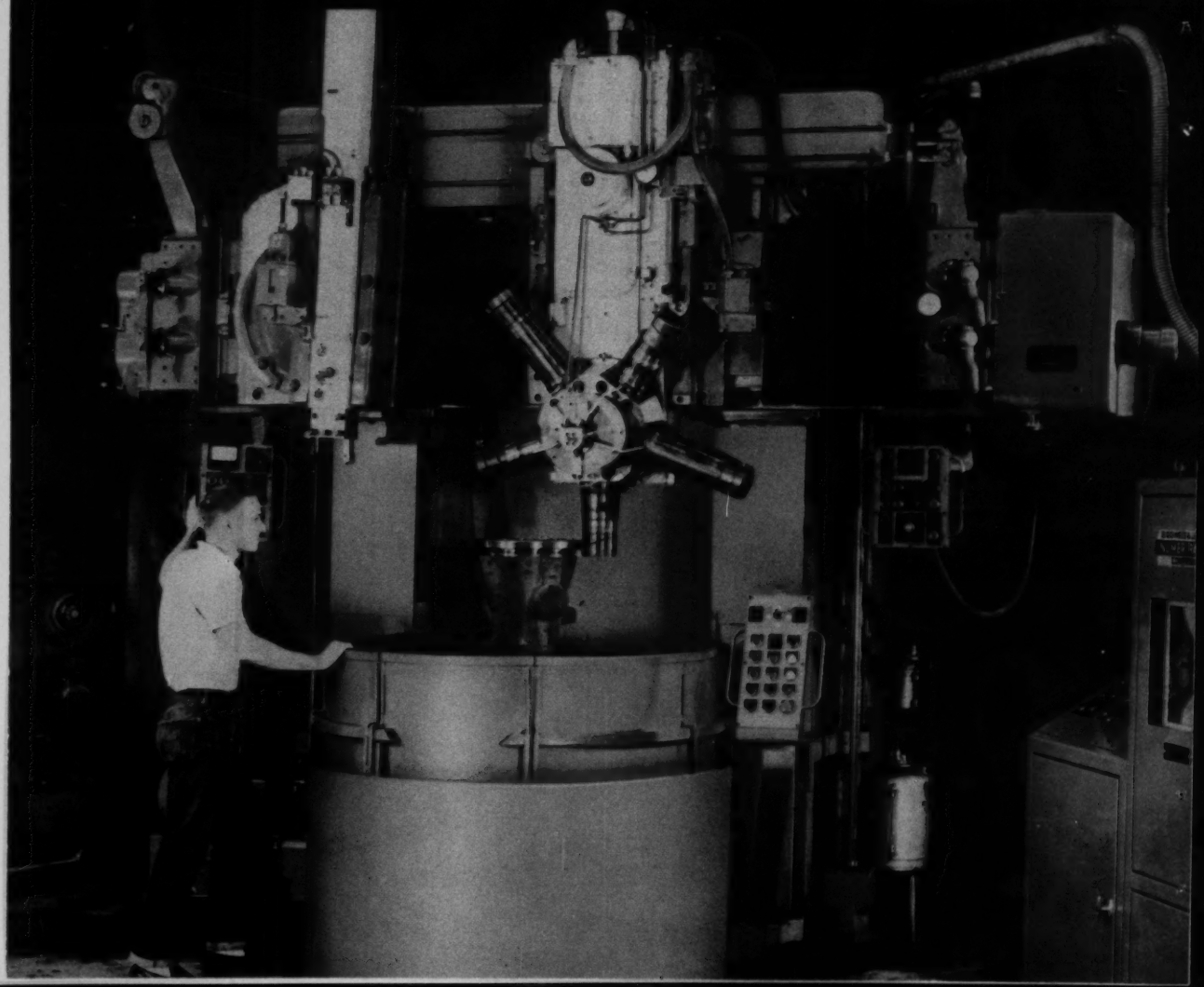
TO SERVE OUR CUSTOMERS FASTER . . . TO AID OUR SHOP PEOPLE IN MEETING COST, DELIVERY, AND QUALITY REQUIREMENTS . . . AND TO EXPAND OUR PRODUCTION WITHOUT ADDING FLOOR SPACE"



JOHN K. McGEE
MANUFACTURING ENGINEER
GRAY TOOL COMPANY
HOUSTON, TEXAS



WIDE RANGE OF ECONOMIC VALUES INVOLVED IN INSTALLATION OF FIRST CONTINUOUS-PATH TAPE-CONTROLLED MACHINE TOOL OUTSIDE OF AIRCRAFT INDUSTRY



Gray Tool Company, Houston, Texas, a leading manufacturer of specialized production equipment for the petroleum industry, recently installed the first magnetic tape path-controlled machine ever to be used outside of the aircraft industry — a 54″ Giddings & Lewis vertical boring mill.

The machine was purchased as part of a planned program designed to accomplish the following objectives:

- A manufacturing system to aid shop personnel in meeting cost, delivery, and quality requirements.
- Increased production with minimum capital investment.
- Better and faster service to customers.
- Assurance of reasonable profits while maintaining good wages and holding down prices in the face of continuing inflation.
- Reduction in inventory of processed or partially processed parts.
- Use of standard multipurpose machines to replace specialized equipment.
- Extensive use of economical throwaway carbide-tipped tooling.
- Ability at any time in the future to economically and accurately duplicate parts which might originally have been produced years before.

Ideal for short runs and short-notice orders. At Gray, short runs of a wide variety of parts are the order of the day. The range is one to 30 parts per run, the average three. Even so-called standard items must be supplied with many small variations to meet specific customer requirements. Another "must" in serving the oil industry is almost immediate delivery, even for a duplicate of a part made 20 years ago.

The G&L machine is meeting these requirements ideally because parts now can be machined to customer's order and shipped within a matter of hours.

Machine tool as a "sales tool." A valuable side effect of the installation has been its aid in selling customers on the capabilities of Gray, the quality of its products, and the speed with which urgent deliveries can be made. Executive personnel of a number of customers have visited the Gray plant specifically to witness the machine in operation on their parts and have come away well satisfied with their choice of a supplier.

Benefits for you in tape control. It will pay you to investigate Giddings & Lewis numerically controlled machine tools if your company is interested in any or all of the following: better production control . . . greater freedom in product design or styling change . . . shorter lead time . . . major reductions in jig and fixturing costs . . . reduction in finished or partially finished parts inventories . . . greater all-around economy and flexibility on short-run production.

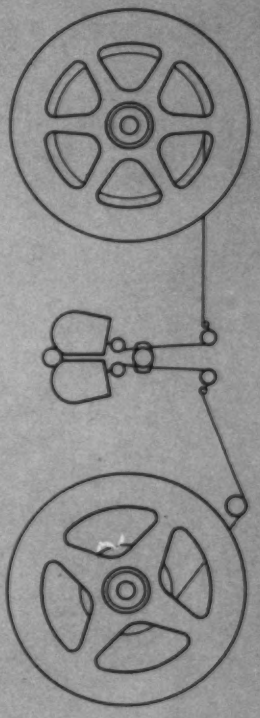
Call your local G&L distributor or write direct.

GIDDINGS & LEWIS

GIDDINGS & LEWIS MACHINE TOOL COMPANY, Fond du Lac, Wis.

GIDDINGS & LEWIS NUMERICAL CONTROL

—The means to automation of short run production



GIDDINGS & LEWIS

SEE BACK PAGE

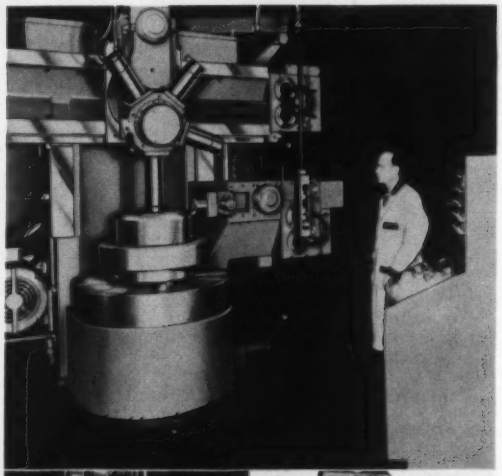
HIGHLY CONTROLLED VERTICAL TURNING AND BORING MACHINES FOR EVERY JOB

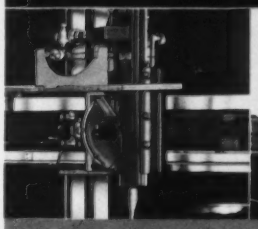
TAPE CONTROL • DUPLI-TRACER PENDANT • PUSHBUTTON • "JOY-STICK" ELECTRONIC READOUT

The Giddings & Lewis Numeripath magnetic tape-controlled vertical boring mill described on the preceding pages is but one of a complete line of G&L vertical turning and boring machines available with control systems to best meet the requirements of any shop.

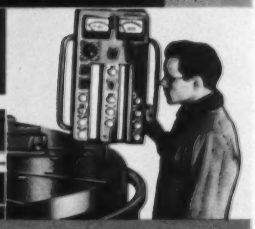
The standard line includes machines having tables from 32-inch to 20-foot diameters. Illustrated at the right is a Giddings & Lewis 42-inch vertical turret lathe operated by G&L Numeripoint punched paper tape discrete positioning control. This machine is available with a five-position turret head and a right side head which can be equipped with four separate tools. Tape control indexes and positions all nine tools and regulates head feeds and table speeds for complete automatic machining.

Also illustrated are other advanced controls available on Giddings & Lewis vertical boring and turning machines to greatly increase productivity and reduce manufacturing costs. For complete information, call your Giddings & Lewis distributor or write for literature.





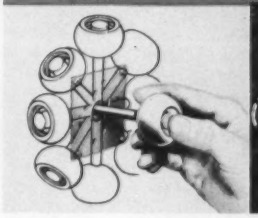
Electronic or hydraulic Dupli-Tracer controls.

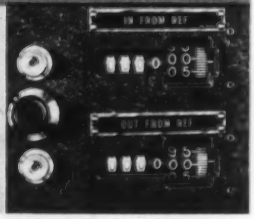


Complete pendant control of all machine functions.

"Joy-stick" control moves the head the direction you move the stick.

Electronic readout to .001" from easily set zero reference points.





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*Numeripath, Numeripoint and Dupli-Tracer are Giddings & Lewis trade-marks.

V-200 Printed in U. S. A.

NEW literature

Write directly to the company for a copy

Pipe Fitters' Manual

Text, tables, and illustrations in this 72 page manual give mathematical, physical, chemical, and metallurgical data. Included: Related design, layout, and mechanical information. Tube Turns Div., Chemetron Corp., Louisville 1, Ky.

Modern Thickness Testing

Various nondestructive methods employed for measuring the thicknesses of organic and nonmagnetic metal coatings on iron and steel are discussed in this brochure. Twin City Testing Corp., 533 S. Niagara St., Tonawanda, N. Y.

Conversion Factors Chart

A wall chart includes common conversions (such as inches to centimeters or watts to horsepower) as well as many conversions that are difficult to locate in reference manuals. Precision Equipment Co., 4411E Ravenswood Ave., Chicago 40, Ill.

Welding Chart

A 23 x 35 in. wall chart covers welding symbols, welding arc, deposition rates, and a metal hardness conversion table. It also describes electrodes. Hobart Bros. Co., Troy, Ohio.

Cerium in Enamels

Data sheets are an aid in applying cerium compounds in enamel manufacturing. Vitro Chemical Co., 342 Madison Ave., New York 17, N. Y.

NEW BOOKS

Marketing Concepts in Changing Times, edited by R. M. Hill (University of Illinois), American Marketing Association, 27 E. Monroe St., Chicago 3, Ill., 412 pages, $4 for members, $6 for nonmembers

Papers delivered at the marketing conference in Washington in 1959 are presented. Subject matter includes foreign marketing in an era of increasing competition, depth interviews, international marketing research, and the federal government's role in marketing.

Pocket Directory of Steel Foundries in the United States, Canada, and Mexico, Steel Founders' Society of America, 606 Terminal Tower, Cleveland 13, Ohio, 240 pages, $3

The directory (published biennially) lists all North American steel foundries, their officers and directors, and the officers, directors, and committees of the Steel Founders' Society.

American Standard Spindle Noses and Arbors for Milling Machines, published by the American Society of Mechanical Engineers, 20 W. 39th St., New York 18, N. Y. $1

The revised publication (B5.18-1960) has been approved by the American Standards Association. It supersedes B5.18-1953. At the suggestion of the American Society of Tool & Manufacturing Engineers, a new spindle nose size (50A) has been added to reflect the growing use of flat back cutters for production milling. Other changes have been made at the request of the National Machine Tool Builders' Association. In addition, the method of dimensioning radial hole locations has been changed to follow the principles set forth in *American Standard Drafting Manual, Dimensioning and Notes* (Y14.5-1957).

Work Sampling for Modern Management, Bertrand L. Hansen, Prentice-Hall Inc., Englewood Cliffs, N. J., 263 pages, $7.50

Theory and how to do it information are given on sampling techniques. This book covers sampling studies from the initial planning stage to the last step in follow-up. It demonstrates how work sampling can improve standards and business operations, increase labor productivity, and simplify performance. The book is crammed with work sheets, alignment charts, tally sheets, random number tables, and standard time computation forms. It also discusses techniques such as time lapse photography.

Unfired Pressure Vessels, Robert Chuse, F. W. Dodge Corp., 119 W. 40th St., New York 18, N. Y., 149 pages, $8.75

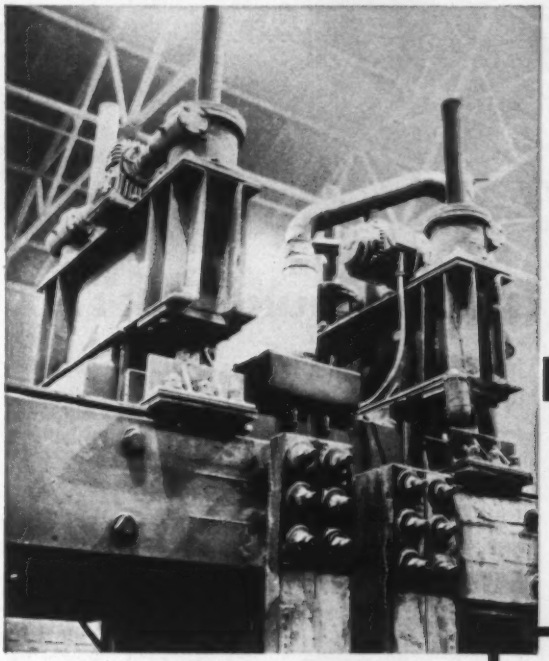
The handbook (fourth edition) has been enlarged, revised, and updated to include current requirements of Section VIII rules for construction of unfired pressure vessels, and of Section IX on welding qualifications of the ASME boiler and pressure vessel code. The book includes 66 tables, charts, and diagrams for designing, ordering, fabricating, inspecting, and repairing unfired pressure vessels.

Mechanical Properties of Structural Materials at Low Temperatures—A Compilation from the Literature, R. M. McClintock and H. P. Gibbons, National Bureau of Standards (order from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.), 180 pages, $1.50

Tensile strength, yield strength, tensile elongation, and impact energy of about 200 materials (metallic and nonmetallic) are presented graphically as functions of temperature between room temperature and absolute zero.

Robertson Guide to World Screw Thread Standards, Small Part Div., W. H. A. Robertson & Co. Ltd., Lynton Works, Bedford, England, 41 pages, $1.50

Over 2000 standards are listed covering 33 countries which have national standards for screw threads. Illustrations help identify 108 screw thread forms and self-tapping screws. Equivalent thread series are given.



100 million pounds per year

That's how much aluminum a modern reduction plant equipped with 1000 Cone-Drive **double-enveloping worm** gearmotors produces. Gearmotors control anodes and casings on the electric furnaces. Ambient temperatures to 300° F and constant reversing are encountered.

Versatile Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

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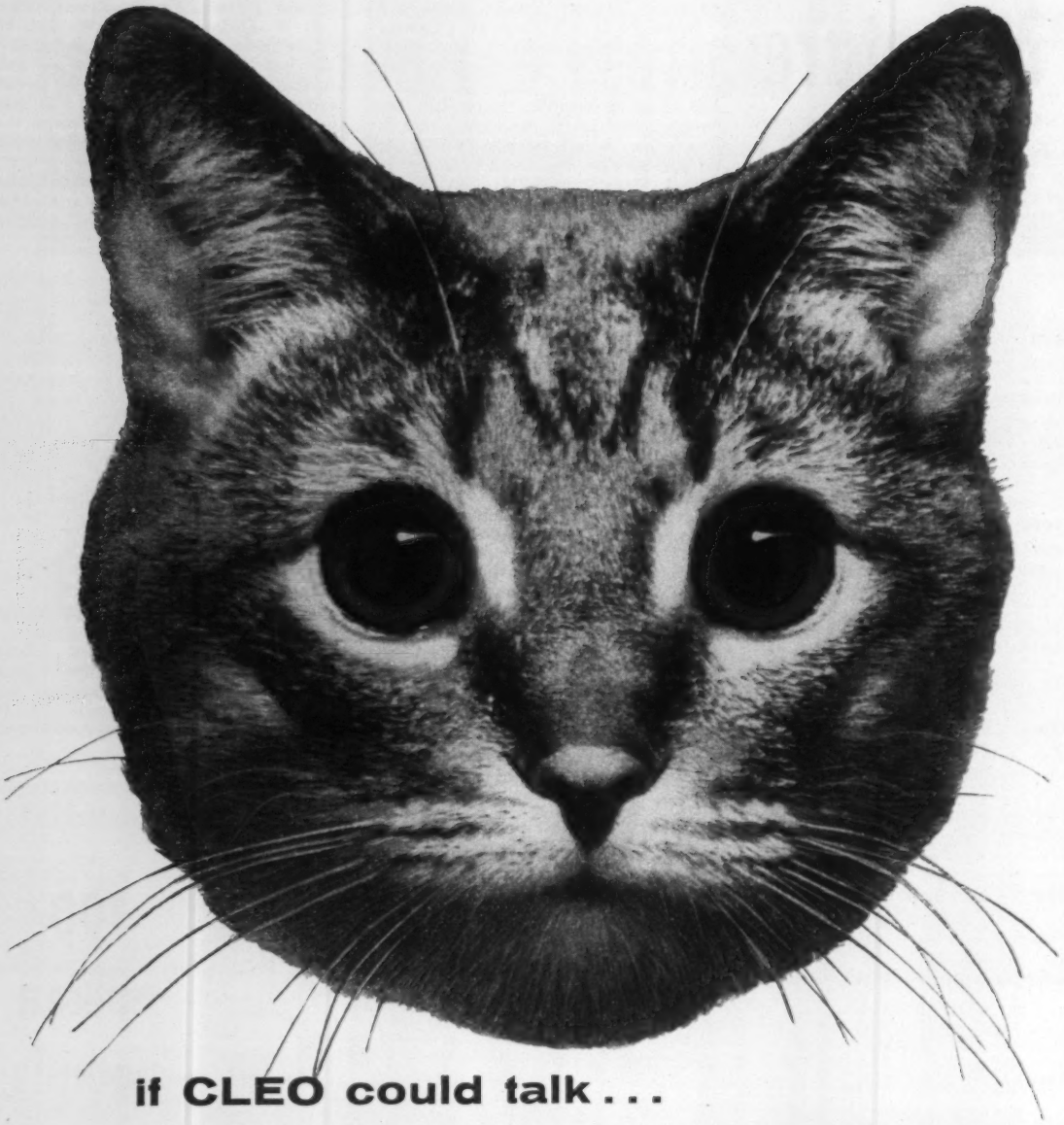

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This is Cleo, a cat who makes her home near the secure warmth of our billet furnace.

Cleo is an eye witness to almost every operation in our plant. Day and night, she sees the relentless effort of our "men of steel" to produce steel of quality . . . men who are qualified not only by years of experience in the production of high quality steel for cold heading and nut formations, but also by a keen CONSISTENT interest to maintain quality . . . and to give every order, regardless of quantity, the *same* special attention.

There are a number of sources for bars and rods, but if CLEO could talk to YOU . . . you'd call Seaway next time you order!

Ask us about a delivery date on your next order! NX 3-9700

SEAWAY STEEL CORPORATION

101 EAST AVENUE • NORTH TONAWANDA, NEW YORK

Users Guess Prices Won't Rise

STEEL BUYERS are betting that there will be no price increase on Dec. 1 when industry wage rates go up an average of 8.4 cents an hour.

Meanwhile, Frank B. Rackley, president, Jessop Steel Co., Washington, Pa., said "it is only a matter of time until we find it necessary to increase prices." He pointed to the urgent need for relief from rising costs (see Page 53).

Fabricators have told STEEL that they plan to do some hedging, but mills see little evidence of a trend in that direction. But there may be some last minute buying of products that can be obtained on short leadtime.

Consumers who believe that their suppliers will hold the line cite two reasons: 1. Competitive pressures from other materials and imported steel. 2. The industry's distaste for the "whipping boy" role that some critics have seemingly assigned it.

Lack of demand isn't regarded as a strong deterrent to higher prices. Consumers recall that the last price hike (August, 1958) came at a time when the market was soft; inventories were being liquidated; and steel was being produced at less than 60 per cent of capacity.

TIN PLATE TIPOFF?— If tin plate producers are going to raise their prices on Dec. 1, they'll have to give the can companies 35 days' notice (tell them this week). Canmakers would be inclined to hedge because 65 per cent of the cost of a can is in the metal. However, they couldn't do themselves too much good in 35 days.

SUPERSERVICE— As consumers pare their inventories to the bone, they're becoming increasingly dependent on fast service from the mills. Steelmakers charge that some of their customers are making "ridiculous" demands. Purchasing agents don't want service that is merely fast, they want it faster—or better still, fastest. Last week, a mill in Western Pennsylvania lost an order for hot rolled strip after promising delivery within a week. A competitor rolled slab into strip overnight, cooled it off, and shipped it the next day.

HIGH HOPES FOR AUTOS— Hopes for an upturn in steel demand got a boost last week when attendance at the National Auto Show broke all previous records. Skeptics thought many of the people came to see Detroit's new exhibition hall, but optimists had good sales reports to buttress their smiles. In the first third of October, auto dealers sold new, U. S.-made cars at the rate of 19,625 per day—the fastest pace for that period since 1955.

The automotive outlook is favorable from a production standpoint—1.5 million assemblies programed for the fourth quarter—but one-third of the cars will be compacts, and each will use about 900 lb less steel than a standard sized auto. Result: New model production won't give steel as much of a push as might normally be expected.

EXPORTS TOP IMPORTS— In August, the latest month for which figures are available, the U. S. exported 328,000 net tons of steel and imported 184,000 tons. For the first eight months, exports total 2,125,000 tons (vs. 1,386,000 tons in the corresponding period last year and 1,694,000 tons in all of 1959). Imports through August total 2,577,000 tons (vs. 2,665,000 tons in the same period last year). Chances are good that the U. S. will ship as much steel overseas this year as it brings in.

INGOT RATE SLIPS— Production declined slightly last week when steelmakers operated their furnaces at 54.6 per cent of capacity, 0.8 percentage point below the previous week's revised rate. Output: About 1,556,000 ingot tons.

WHERE TO FIND MARKETS & PRICES

	News	Prices
Bars, Merchant	160	143
Reinforcing	160	144
Boiler Tubes	...	146
Canada	...	*
Charts:		
Finished Steel	...	141
Ingot Rate	140	...
Scrap Prices	...	153
Clad Steel	...	147
Coal Chemicals	...	149
Coke	...	149
Comparisons	...	141
Contracts Placed	140	...
Contracts Pend.	140	...
Electrodes	...	149
Fasteners	...	146
Ferroalloys	...	150
Fluorspar	...	149
Footnotes	...	150
Imported Steel	...	149
Ingot Rates	140	...
Ingot Production	139	...
Metal Powder	...	149

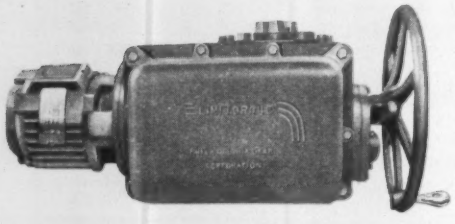
	News	Prices
Nonferrous Met.	156	158
Ores	...	149
Pig Iron	159	148
Piling	...	143
Plates	138	143
Plating Material	...	159
Prestressed Strand	...	146
Price Indexes	...	141
Producers' Key	144	...
R.R. Materials	...	146
Refractories	...	149
Scrap	153	154
Semifinished	...	143
Service Centers	160	148
Sheets	138	144
Silicon Steel	...	145
Steel Shipments	140	...
Stainless Steel	...	147
Strip	138	145
Structurals	140	143
Tin Mill Prod.	138	145
Tool Steel	...	147
Tubular Goods	...	147
Wire	138	145

*Current prices were published in the Oct. 17 issue and will appear in subsequent issues.

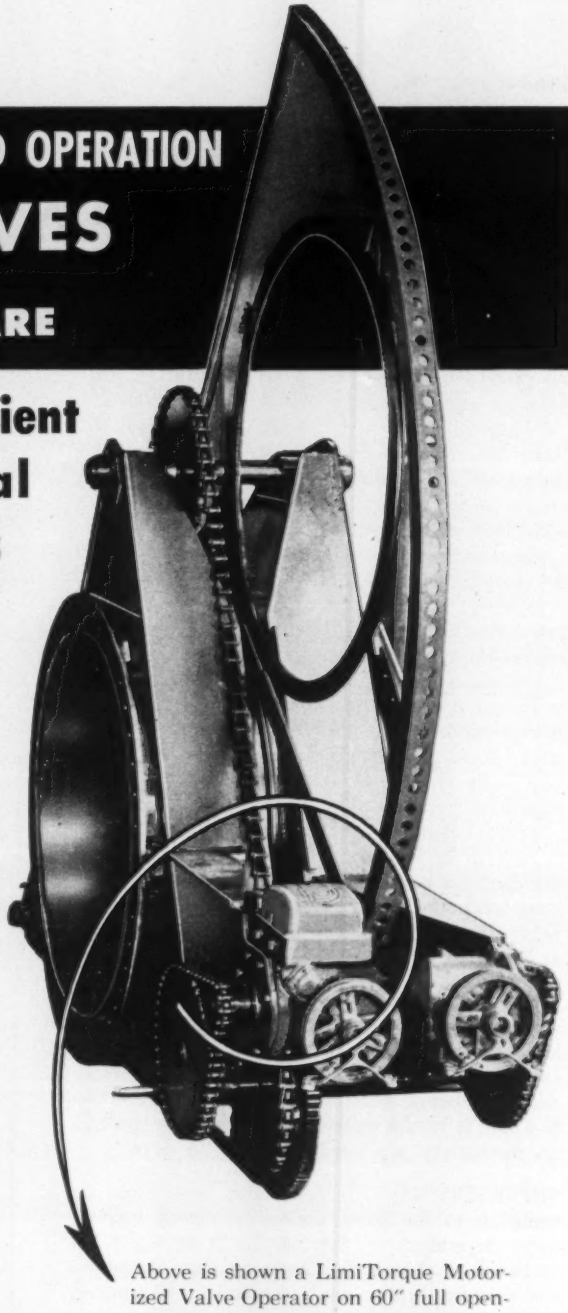
Push-Button MOTORIZED OPERATION *of* GOGGLE VALVES BY LimiTorque ARE

Faster, Safer, more Convenient and far more Economical than hand operated valves

LimiTorque Motorized Valve Operators on large Goggle Valves have proven of true value in many steel plants because of their quick, safe and positive cut-off of Blast Furnace, Coke Oven and other types of gases. The use of LimiTorque Operators also easily takes care of Goggle Valves in inaccessible locations; reduces exposure of operating personnel to toxic gases. Another point, operation of Goggle Valves with LimiTorque permits actuation by chain wheel, should there be a power failure at any time.



Write for Bulletin #1-60, which gives full details for LimiTorque Operation of Goggle Valves . . . use your Business Letterhead when requesting a copy.



Above is shown a LimiTorque Motorized Valve Operator on 60" full opening Brosius-Westling Goggle Valve recently installed in a Blast Furnace Gas Main, at a large Mid-Western Steel Plant.

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PHILADELPHIA GEAR CORPORATION

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INDUSTRIAL GEARS & SPEED REDUCERS • LIMITORQUE VALVE CONTROLS • FLUID AGITATORS • FLEXIBLE COUPLINGS

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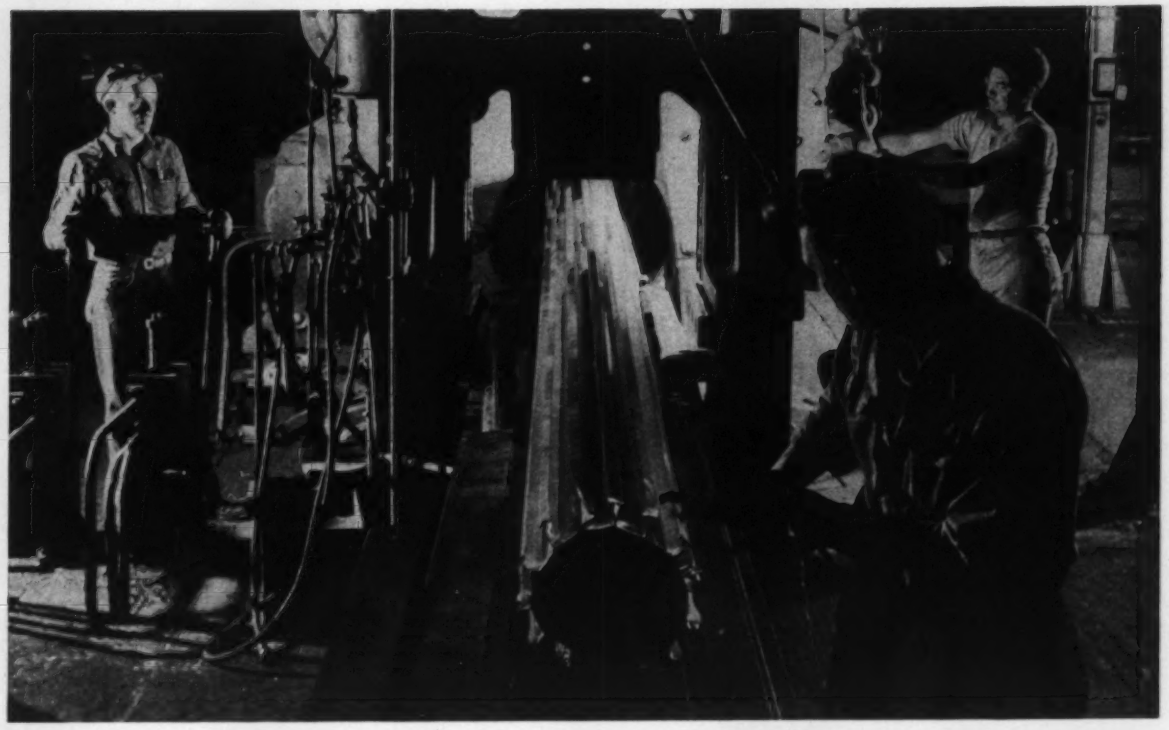


Aluminum Extruders Fight Uphill Battle

- **Capacity: Rising**
- **Sales: Lagging**
- **Prices: Dropping**
- **Profits: Dwindling**

PRICE FIGHTING has put the profit squeeze on many aluminum extruders.

One producer comments: "The extrusion business used to be highly profitable. Today, it can only be described as borderline. Prices have weakened to where some companies are operating in the red."

Any extruder will tell you price fighting has hit an all-time high. Most industry people say: Unless the situation is cleared up soon, no one will be making money. Several large producers have folded or closed down their plants.

The basic problem: Intense competition brought on by too much capacity.

● **Too Many Extruders**—The U. S. has about 140 integrated, nonintegrated, and captive extruders that operate around 370 presses. If they worked around the clock six days a week, they could turn out about 2.5 billion lb of soft and hard alloys yearly.

Demand is nowhere near that figure. The industry's shipments hit 1,052,000,000 lb in 1959, its best year. This year, shipments have slumped (they'll probably total 890 million to 900 million lb), a situation that has weakened an already shaky price structure.

● **Capacity Still Rising**—Extruders continue to expand. One industry man offers this explanation: "Many extruders feel that if they can increase poundage output, they can increase profits. What they don't realize is that they are further contributing to chaotic prices."

An aluminum producer observes: "Believe it or not, many independent extruders don't even know their

(*Please turn to Page* 138)

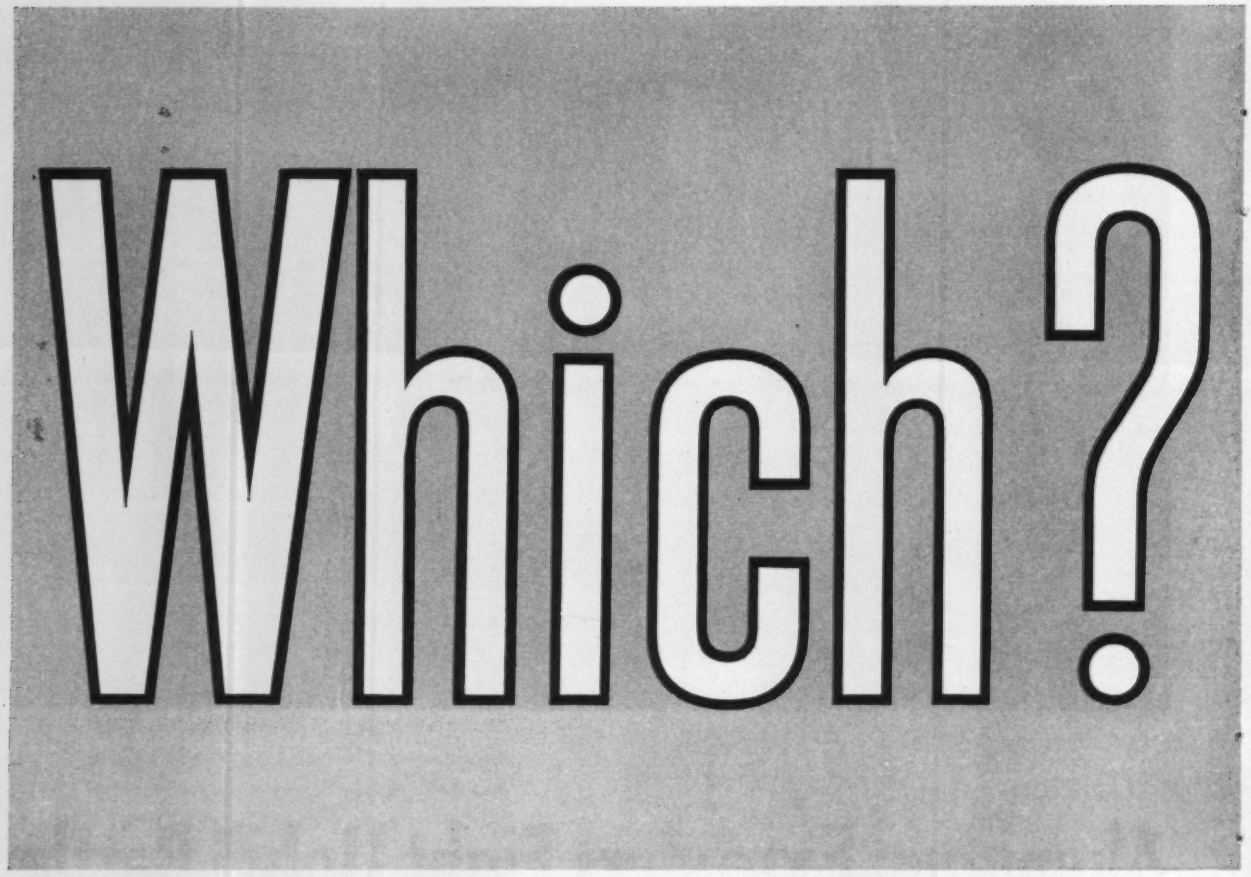
Shipments Fall in '60

(Aluminum extrusions in lb)

1955	749,000,000
1956	765,000,000
1957	763,000,000
1958	803,000,000
1959	1,052,000,000
1960	890,000,000*
1961	980,000,000*

*Estimated.

Source: Bureau of the Census.



Which of these "job-graded" Carboloy® cemented carbides is right for your operation? And why?

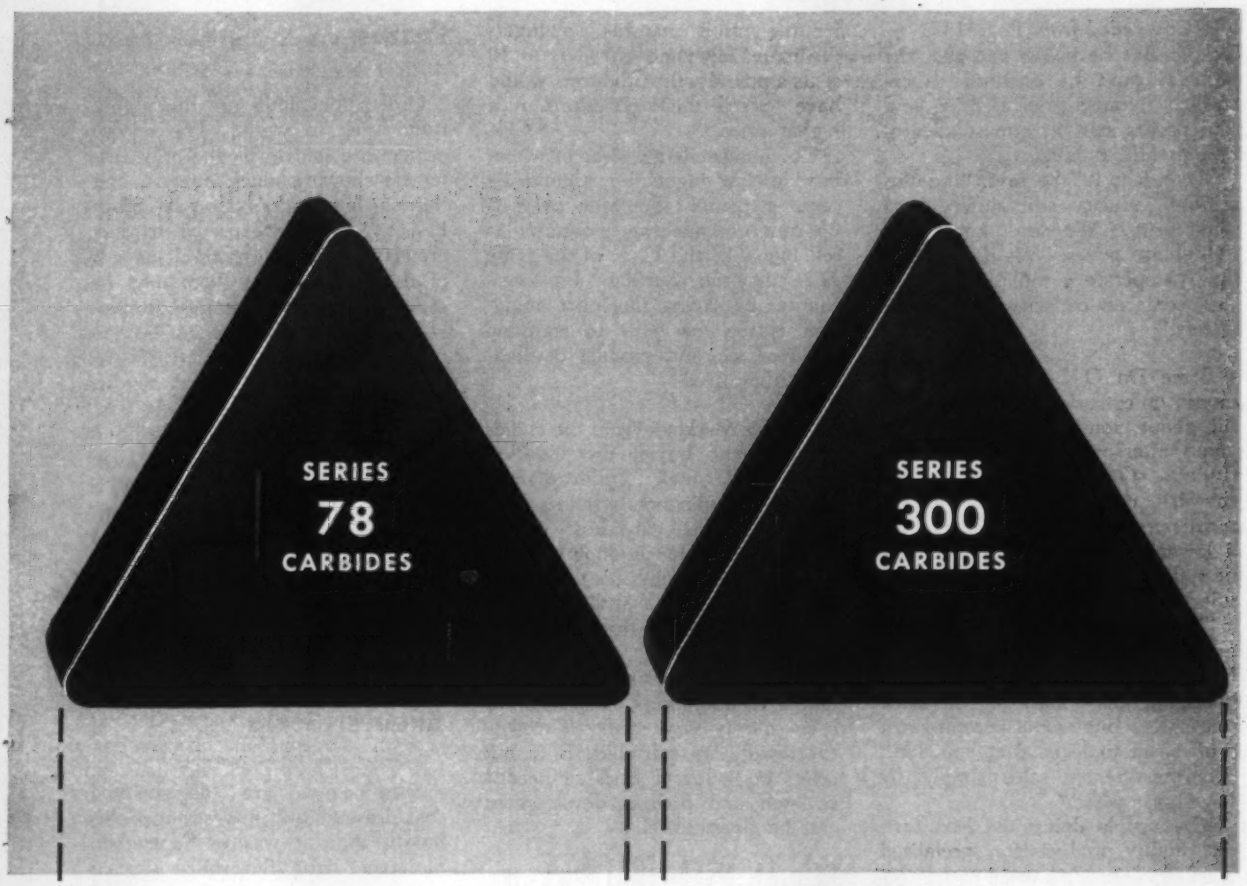
What is your machining problem? Carboloy cemented carbides are job-graded for *every* disposable insert and carbide-cutting-tool application as a solution to your problem. Job-graded to help you choose the *right* carbide. Job-graded so you can count on optimum results from every Carboloy tool or insert you use. *And, with Carboloy carbides, you get the same consistent quality order after order after order!*

Carboloy inserts for steel-cutting grades are available PRE-HONED!

Ready-to-use inserts honed to a precise radius in a complete line of job-graded carbides — that's what you get when you specify pre-honed Carboloy cemented carbide inserts.* Designed to reduce chipping, increase predictable tool life, withstand cutting pressures better, Carboloy pre-honed inserts offer savings in time and labor.

Your Carboloy representative or Authorized Distributor is the man who can best fill you in on the job-graded carbide best suited to *your* machining requirements. Contact him today . . . or write: *Metallurgical Products Department of General Electric Company, 11141 E. 8 Mile Ave., Detroit 32, Michigan.*

*Carbides in the 78 series are all pre-honed. Carbides in the 300 series are available pre-honed, precision-ground, or utility ground.



78 SERIES GRADES

Where machine capacity is limited, the low initial tool cost of 78 series carbides provides real economy in normal steel-cutting operations; offers optimum output-per-dollar. In this series, the improved 78B grade is best to use where carbides are being initially applied to steel-machining operations. *All* disposable carbide inserts in the 78 series come pre-honed to serve you better; save you time and labor.

300 SERIES GRADES

Heavy-duty, heavy-feed steel-cutting applications? Then a carbide from the 300 series is the one to choose. This is the Carboloy series designed to cover a wide range of steel-cutting operations — everything from precision finishing to heavy-duty roughing — *all* at a lower cost-per-piece for such a variety of jobs. Most inserts in the 300 series are available *pre-honed*, precision-ground, or utility ground.

CARBOLOY®
CEMENTED CARBIDES

METALLURGICAL PRODUCTS DEPARTMENT

GENERAL ELECTRIC

CARBOLOY® CEMENTED CARBIDES • MAN-MADE DIAMONDS • MAGNETIC MATERIALS • THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS

(*Concluded from Page* 135)

costs." But he points out, that the problem can't be confined to extrusions because price fighting and thin profits exist in almost all aluminum mill products.

"Let's face it," he says, "the aluminum industry still suffers from immaturity. We don't know how to stabilize prices. We don't know how to operate a mill at 40 to 50 per cent of capacity and make money."

• **Some Do O.K.**—You can make money on extrusions if you are careful about your business, not just going after volume, say some extruders. Others disagree. They say it's common for an out-of-towner to woo local customers with a lower price. To keep the business, the local company has to follow suit.

"So no one wins," says an Eastern extruder. "The only thing that has happened is that now we're taking in less dollars for the same tonnage. But some people just can't seem to learn that you don't generate greater sales simply by lowering a price."

The people doing the best turn out quality products for specialized markets. There's a trend among extruders to become more fully integrated—some claim it's the only thing that has kept them afloat. They go a step beyond the extrusion process and finish or fabricate into a part or product.

• **Who's at Fault**—Friction between primary producers and independent extruders is worse than ever.

The producers' viewpoint: The independents started the price fighting; they control more than 75 per cent of the market and are therefore in a position to set prices. The independent sets the tone of the market because the job shop nature of the extrusion business allows him to operate more efficiently; he has lower overhead, fewer costs, greater flexibility.

The independents' viewpoint: Primary producers are the only ones who can stabilize prices. If they would move up, the large independents would follow, and, eventually, the small independents would be forced to fall in line if they want to make any money. The producers will play with every price but that of ingots. If it weren't for the profit margins on ingots (estimated by some extruders at 10 cents a pound), the producers would have to sell their extrusions at a higher price.

The independents, some of whom buy foreign ingots for around 24 cents a pound (domestic price is 26 cents), want the producers to sell ingots in the U. S. at the same price they do overseas. Producers counter by saying the ingot quotation is too low now to continue the research and product development they need.

• **Buyer's Market**—From the standpoint of the buyer, the situation is a good one. Unfortunately, there are indications that quality is slipping as extruders (storm window parts, for example) try to cut corners to stay in the black. Many extruders are afraid that the letdown could hurt the industry in the future.

But the consensus is: The potential for aluminum extrusions has been hardly scratched. The key to growth, say extruders, is to put prices on a sound basis so needed research and product development can be financed.

Blough Expecting Pickup In Steel This Quarter

Steel consumption this year will exceed that of the last two years, approaching the record levels of 1955-57, Roger M. Blough, chairman, U. S. Steel Corp., told a meeting of the National Industrial Conference Board. However, ingot production, ranging between 100 million and 105 millions tons, will fall substantially under the average of 115 million tons in 1955-57, he said.

Chairman Blough explained that high consumption and "relatively" low production this year is due to a change in inventory policy—from inventory building in the first quarter of the year to inventory cutting. Inventory cutting has gone "about as far as it can go," and he expects some improvement in new orders this quarter, he asserts.

The steel leader also said that while the compact automobile uses less steel per unit, the new type car has stimulated domestic auto sales, and the industry's total consumption of steel this year is likely to be exceeded only by that in 1955.

Plates . . .

Plate Prices, Page 143

Orders for plates are fluctuating from week to week. The service centers are said to be the only customers showing much interest, and they're buying only on a fill-in basis. Sales are expected to stay pretty much at today's level the rest of the year, though there may be some buying for inventory in November and December.

Wire . . .

Wire Prices, Pages 145 & 146

Wire products continue in slow demand. A little improvement is noted in the movement of manufacturers' wire, but it hasn't caused any change in delivery promises, which still range three to four weeks. Merchant wire items are available from stock, with buyers' requirements light.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 144 & 145

Sheetmakers are disappointed that demand isn't any stronger this month than it was in September. However, light, flat rolled steel is still the most active of the major steel product categories, with automotive requirements contributing principally to over-all demand.

Automotive buying is not up to expectations, although the auto production outlook is considered favorable—1.5 million assemblies programed for fourth quarter.

There's no evidence of hedging against a possible price increase Dec. 1. Consumers seem to think competitive pressures will hold prices in line.

Tin Plate . . .

Tin Plate Prices, Page 145

Demand for tin plate went into a tailspin this month. Sales executives had expected a decline in orders when the packing season passed its peak, but they hadn't anticipated a market collapse. Canmakers are liquidating stocks left from summer. They didn't use as much tin plate as expected because cool weather stunted the crops and kept beer consumption below normal.

If producers are to raise prices

Dec. 1 when wages go up, they'll have to make their policy known this week—they normally give their canmaking customers 35 days notice of a price change.

Nine-Month Steel Output Is Fifth Best on Record

Production of ingots and steel for castings in September totaled 6,439,000 net tons, bringing output for the third quarter to 19,627,924 tons; the total for the first nine months was 80,382,019 tons, reports the American Iron & Steel Institute.

The nine month figure was the fifth largest for any similar period on record, despite the decline in production during the spring and summer. It compared with 72,484,673 tons in the like 1959 period, when production was curtailed by the nationwide steel strike.

Steelmaking operations averaged 72.1 per cent of capacity during the nine months. Significantly, during the first nine months of 1951, the rate averaged 100.5 per cent of capacity, but production was only 78.4 million tons.

Here are comparisons based on the institute's index of steelmaking (average production 1947-49 equals 100): Nine months, 1960, equal to 127.8 vs. 115.7 in the like nine months of 1959; third quarter, 1960, equal to 93.0 vs. 124.6 in the second quarter this year and 38.9 in the third quarter last year; September, 1960, equal to 93.5 vs. 96.1 in the preceding month and 22.3 in the like month last year.

The following are percentages of operations on the Jan. 1, 1960, capacity rating of 148.570,970 net tons: Nine months, 72.1 per cent; third quarter, 52.4 per cent; September, 52.7 per cent.

Switchgear Prices Cut

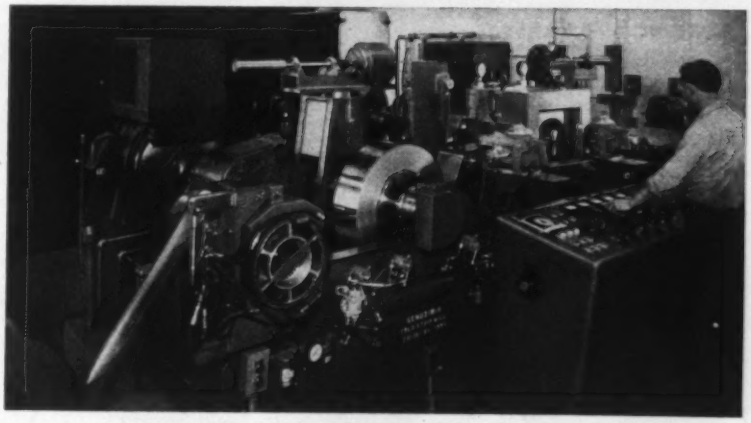
Reduced prices on indoor and outdoor, metal clad switchgear and low voltage, metal enclosed switchgear are announced by the Assembled Switchgear & Devices Dept., Westinghouse Electric Corp., Pittsburgh. The reductions, about 10 per cent on a net price basis, are published in two new catalog sections.

Steel Ingot Production—September, 1960

Period	OPEN HEARTH (Net tons)	BESSEMER (Net tons)	OXYGEN PROCESS (Net tons)	ELECTRIC (Net tons)	TOTAL (Net tons)	Percentage of capacity
1960						
January	10,510,616	211,132	280,981	1,046,675	12,049,404	95.5
February	9,715,527	215,263	245,458	949,558	11,126,806	94.3
March	10,103,122	202,812	306,741	952,008	11,564,683	91.6
1st Qtr	30,329,265	630,207	833,180	2,948,241	34,740,893	93.8
April	8,603,306	105,336	302,763	766,452	9,777,857	80.1
May	7,844,140	73,010	309,505	603,817	8,830,472	70.0
June	6,441,594	80,344	314,766	568,169	7,404,873	60.6
2nd Qtr.	22,889,040	258,690	927,034	1,938,438	26,013,202	70.2
1st Half	53,218,305	888,897	1,760,214	4,886,679	60,754,095	82.0
July	5,494,331	61,700	289,003	505,890	6,350,924	50.3
*August	5,860,394	52,652	279,550	645,404	6,838,000	54.2
†September	5,526,000	42,000	287,000	584,000	6,439,000	52.7
†3rd Qtr.	16,880,725	156,352	855,553	1,735,294	19,627,924	52.4
†9Mo.	70,099,030	1,045,249	2,615,767	6,621,973	80,382,019	72.1
1959						
January	8,280,985	120,005	186,820	729,575	9,317,385	74.3
February	8,541,031	128,515	176,970	756,422	9,602,938	84.8
March	10,216,474	184,892	236,595	929,784	11,567,745	92.3
1st Qtr	27,038,490	433,412	600,385	2,415,781	30,488,068	83.8
April	9,884,322	195,730	237,018	964,850	11,281,920	93.0
May	10,117,968	200,887	257,325	1,024,401	11,600,581	92.5
June	9,521,053	185,794	259,731	941,056	10,907,634	89.9
2nd Qtr	29,523,343	582,411	754,074	2,930,307	33,790,135	91.8
1st 6 Mo.	56,561,833	1,015,823	1,354,459	5,346,088	64,278,203	87.8
July	4,541,741	66,433	98,634	525,368	5,232,176	41.7
August	1,171,342	.....	.....	267,935	1,439,277	11.5
September	1,219,398	.....	.....	285,619	1,535,017	12.7
3rd Qtr	6,962,481	66,433	98,634	1,078,922	8,206,470	22.1
9 Mo.	63,524,314	1,082,256	1,453,093	6,425,010	72,484,673	65.6
October	1,385,490	.....	.....	319,043	1,704,533	13.6
November	6,290,659	92,361	129,794	754,793	7,267,607	59.9
December	10,468,534	205,666	281,451	1,033,668	11,989,319	95.6
4th Qtr	18,144,683	298,027	411,245	2,107,504	20,961,459	56.3
2nd 6 Mo.	25,107,164	364,460	509,879	3,186,426	29,167,929	39.2
Totals	81,668,997	1,380,283	1,864,338	8,532,514	93,446,132	63.3

Note—The percentages are based on annual capacities as of Jan. 1, 1960: Open hearth, 126,621,630 net tons; bessemer, 3,396,000 net tons; basic oxygen process, 4,157,400 net tons; electric and crucible, 14,395,940 net tons. Total: 148,570,970 net tons. In 1959, the capacity tonnages were: Open hearth, 126,528,380 net tons; bessemer, 3,577,000 net tons; basic oxygen process, 4,033,160 net tons; electric and crucible, 13,495,130 net tons. Total: 147,633,670 net tons.
†Preliminary. *Revised.

SAVE ON THIN GAUGE STRIP



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Structural Shapes . . .

Structural Shape Prices, Page 143

Structural steel demand is holding up moderately well at some points, notably in the East where some office building and commercial construction, along with a substantial volume of public work, gives the market fair support. Compared with two weeks or so ago, the structural mills are booking more tonnage.

At Pittsburgh, Cleveland, and other Midwest points, October bookings have been disappointing. Most of the jobs coming out involve small tonnages. Because the railroad car builders aren't buying, standard structurals are not moving as well as had been hoped.

Competitive prices for fabricated structural steel have contributed to highway contracts that average 11.1 per cent under state engineer cost estimates for federal roads.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PENDING

2800 tons, two railroad and one highway bridges, center leg connection, Southwest Freeway inner loop; bids Nov. 1, Department of Highways, District of Columbia.

900 tons, plant, Rowe Mfg. Co., Whippany, N. J.; bids asked through Engineers Inc., Newark, N. J.

500 tons, Ideal Cement Co., terminal plant, Seattle; general contract to Hoffman Construction Co., Portland, Oreg. at $2,103,560.

REINFORCING BARS . . .

REINFORCING BARS PLACED

600 tons, women's dormitory, University of Southern Florida, Tampa, Fla., to Laclede Steel Co., St. Louis, through William A. Berbusse Jr., Palm Beach, Fla., general contractor.

470 tons, junior high school, Needham, Mass., to Bethlehem Steel Co., Bethlehem, Pa., through Park Construction Co., Boston, general contractor; 70 tons of structurals went to Groisser & Shlager Iron Works, Somerville, Mass.

350 tons, Dexter Manor housing project, Providence, R. I., to Plantations Steel Co., Providence; E. Turgeon Construction Co. Inc., Providence, general contractor; also required, 131 tons of steel joists, to Truscon Steel Div., Republic Steel Corp., Boston, and 70 tons of fabricated structurals to Providence Steel & Iron Co., Providence.

200 tons, Mercer Island High School, Seattle, to Northwest Steel Rolling Mills Inc., Seattle; Drummond Construction Co., Seattle, general contractor.

110 tons, addition to Roosevelt High School gymnasium, Seattle, to Pacific Coast Div., Bethlehem Steel Co., Seattle; General Construction Co., Seattle, general contractor.

REINFORCING BARS PENDING

645 tons, three bridges, center leg connection, Southwest Freeway inner loop, Washington; bids Nov. 1, Department of Highways, District of Columbia.

224 tons, state bridgework, Bergen County, New Jersey; bids Nov. 3.

100 tons or more, Science Building, Eastern Washington College, Cheney, Wash.; Max J. Kuney Co., Spokane, Wash., low at $967,750.

Steel Shipments by Markets—August, 1960

(Net tons; all grades)

	August		First 8 Months	
Markets:	Net Tons	% of Total	Net Tons	% of Total
Converting, processing	190,966	3.8	2,177,813	4.1
Forgings (except auto)	55,675	1.1	633,625	1.2
Fasteners	69,192	1.4	789,724	1.5
Warehouses:				
Oil & gas	77,602	1.5	812,643	1.6
All other	766,847	15.1	8,579,793	16.3
Total warehouse	844,449	16.6	9,392,436	17.9
Construction:				
Rail transportation	2,927	0.1	35,915	0.1
Oil & gas	194,397	3.8	1,636,791	3.1
All other	556,934	11.0	5,386,919	10.2
Total construction	754,258	14.9	7,059,625	13.4
Contractors' Products	252,114	5.0	2,686,096	5.1
Automotive:				
Cars, trucks, parts	990,030	19.5	10,121,782	19.2
Forgings	32,382	0.7	319,067	0.6
Total automotive	1,022,412	20.2	10,440,849	19.8
Rail transportation:				
Rails, track, equipt.	41,407	0.8	644,238	1.2
Cars & locomotives	87,973	1.7	1,389,009	2.6
Transit systems	1,696	0.1	24,869	0.1
Total transportation	131,076	2.6	2,058,116	3.9
Shipbuilding	44,068	0.9	424,779	0.8
Aircraft	6,427	0.1	56,810	0.1
Oil & gas drilling	27,806	0.5	319,424	0.6
Mining, Quarrying, etc.	22,335	0.4	205,703	0.4
Agricultural:				
Machinery	44,054	0.9	545,840	1.0
All other	14,904	0.3	173,859	0.4
Total agricultural	58,958	1.2	719,699	1.4
Machinery & tools	246,704	4.9	3,909,367	5.7
Elec. machinery	146,500	2.9	1,478,295	2.8
Appliances, etc.	97,402	1.9	1,328,631	2.5
Other equipment	139,051	2.7	1,437,591	2.7
Containers:				
Cans & closures	463,748	9.1	3,909,367	7.4
Barrels, drums, etc.	58,255	1.2	615,131	1.2
All other	45,482	0.9	465,026	0.9
Total containers	567,485	11.2	4,989,524	9.5
Ordnance, military	15,592	0.3	110,046	0.2
Nonclassified	174,656	3.4	1,456,950	2.8
Total domestic shipments	4,867,126	96.0	50,766,871	96.4
Exports	204,827	4.0	1,867,112	3.6
Total shipments	5,071,953	100.0	52,633,983	100.0

Data from American Iron & Steel Institute.

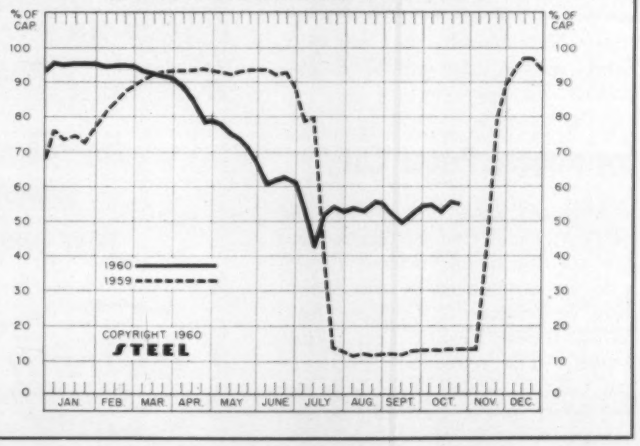
DISTRICT INGOT RATES

(Percentage of capacity utilized)

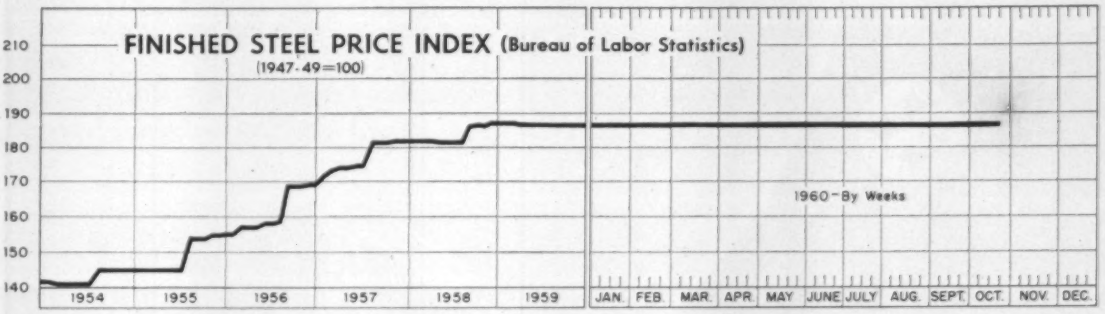
	Week Ended Oct. 23	Week Ago	Month Ago	Year Ago
Northeastern	58	62	62	*
Buffalo	58	56	59	*
Pittsburgh	48	46	42	*
Youngstown	43	46	47	*
Cleveland	55	56	55	*
Detroit	69	69	71	*
Chicago	58	60	61	*
Cincinnati	63	62	57	*
St. Louis	75	78	77	*
Southern	52	51	47	*
Western	54	56	55	*
Total Industry	54.6	55.4	54.3	13.1
Index (1947-49=100)	96.9	98.3	96.3	23.1
Net Tons (In thousands)	1,556	1,579	1,547	371

Current week's figures are preliminary. Weekly capacity (net tons): 2,849,306 in 1960 and 2,831,331 in 1959. Source: American Iron & Steel Institute. *Not available due to general strike.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Oct. 18, 1960	Week Ago	Month Ago	Sept. Index	Year Ago
186.2	186.2	186.2	186.2	186.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Oct. 18

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloys, High Speed, W18, Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.335
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.775
Sheets, C.R., Stainless, 302 (lb)	0.658
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.489
Strip, C.R., Stainless, 430 (lb)	0.480
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.495
Pipe, Galv., Buttweld (100 ft)	23.098
Pipe, Line (100 ft)	195.430
Casing, Oil Well, Carbon (100 ft)	201.080
Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	195.395
Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (bundles)	7.647
Nails, Wire, 8d Common	9.433
Wire, Barbed (80-rod spool)	8.414
Woven Wire Fence (20-rod roll)	21.003

STEEL's FINISHED STEEL PRICE INDEX

	Oct. 19 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	208.90
Index in cents per lb	6.713	6.713	6.713	6.713	5.661

STEEL's ARITHMETICAL PRICE COMPOSITES

	Finished Steel, NT	No. 2 Fdry, Pig Iron, GT.	Basic Pig Iron, GT	Malleable Pig Iron, GT	Steelmaking Scrap, GT
Oct. 19 1960	$149.96	66.49	65.99	67.27	30.17
Week Ago	$149.96	66.49	65.99	67.27	30.17
Month Ago	$149.96	66.49	65.99	67.27	32.00
Year Ago	$149.96	66.49	65.99	67.27	44.33
5 Yr Ago	$128.14	58.99	58.49	59.77	45.00

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Oct. 19 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.90
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.90
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.88
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.50
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.25
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.45

*Including 0.35c for special quality.

SEMIFINISHED STEEL	Oct. 19 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, ½-⅝" Pitts.	6.40	6.40	6.40	6.40	5.025

PIG IRON, Gross Ton	Oct. 19 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$59.50
Basic, Valley	66.00	66.00	66.00	66.00	58.50
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	62.16
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	62.66
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	59.00
Malleable, Chicago	66.50	66.50	66.50	66.50	59.00
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)	Oct. 19 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
No. 1 Heavy Melt, Pittsburgh	$28.50	$28.50	$30.50	$44.50	$44.50
No. 1 Heavy Melt, E. Pa.	34.00	34.00	35.00	45.00	46.50
No. 1 Heavy Melt, Chicago	28.00	28.00	30.50	43.50	44.00
No. 1 Heavy Melt, Valley	27.50	28.50	31.50	44.50	45.00
No. 1 Heavy Melt, Cleve.	25.50	26.50	29.50	41.50	45.50
No. 1 Heavy Melt, Buffalo	27.50	27.50	29.50	33.50	38.50
Rails, Rerolling, Chicago	48.00	49.50	52.50	64.50	65.50
No. 1 Cast, Chicago	36.50	36.50	39.50	57.50	48.50

COKE, Net Ton	Oct. 19 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$13.625
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	26.25

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WASHINGTON STEEL CORPORATION

Washington, Pa.

*REG. T.M.

Steel Prices

Mill prices as reported to STEEL, Oct. 19, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 144; footnotes, page 146.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$76.00

INGOTS, Alloy (NT)
Detroit S41 ....$52.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 ....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
Sharon,Pa. S3 ....82.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 ....80.00
Buffalo R2 ....80.00
Clairton,Pa. U5 ....80.00
Ensley,Ala. T2 ....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 ....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 ....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 ....80.00
Youngstown R2 ....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 ....99.50
Canton,O. R2 ....102.00
Clairton,Pa. U5 ....99.50
Conshohocken,Pa. A3..104.50
Ensley,Ala T2 ....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 ....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 ....99.50
Geneva,Utah C11 ....99.50
Houston S5 ....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 ....109.00
Midland,Pa. C18 ....99.50
Munhall,Pa. U5 ....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 ....109.00
Sharon,Pa. S3 ....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ..99.50
S.SanFrancisco B3 ..109.00
Warren,O. C17 ....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 ....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3 ..126.00
Detroit S41 ....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 ....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 ....119.00
Houston S5 ....124.00
Ind.Harbor,Ind. Y1 ....119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 ....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 ....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 ....119.00
Owensboro,Ky. G8 ....119.00
Seattle(6) B3 ....140.00
Sharon,Pa. S3 ....119.00
S.Chicago R2,U5,W14..119.00
S.Duquesne,Pa. U5 ..119.00
Struthers,O. Y1 ....119.00
Warren,O. C17 ....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$122.50
Canton,O. R2 ....125.00
Cleveland R2 ....122.50
Gary,Ind. U5 ....122.50
S.Chicago,Ill. R2,W14..122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 ....122.50

SKELP
Aliquippa,Pa. J5 ....5.05
Benwood,W.Va. W10 ....5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 ....5.05
Pittsburgh J5 ....5.05
Warren,O. R2 ....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 ....6.40
Alton,Ill. L1 ....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 ....6.40
Cleveland A7 ....6.40
Donora,Pa. A7 ....6.40
Fairfield,Ala. T2 ....6.40
Houston S5 ....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 ....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 ....6.50
LosAngeles B3 ....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 ....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 ....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 ....6.50
Struthers,O. Y1 ....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 ....5.50
Atlanta A11 ....5.70
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa. B2 ....5.55
Birmingham C15 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Houston S5 ....5.60
Ind.Harbor,Ind I-2, Y1..5.50
Johnstown,Pa. B2 ....5.55
Joliet,Ill. P22 ....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 ....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 ....5.50
Niles,Calif. P1 ....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 ....6.25
S.Chicago,Ill. U5, W14 ..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 ....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 ....5.50
Sterling,Ill. N15 ....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....6.90
Munhall,Pa. U5 ....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ....8.05
Bessemer,Ala T2 ....8.05
Bethlehem,Pa. B2 ....8.10
Clairton,Pa. U5 ....8.05
Fairfield,Ala. T2 ....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 ....8.05
Geneva,Utah C11 ....8.05
Houston S5 ....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 ....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 ....8.75
Munhall,Pa. U5 ....8.05
Seattle B3 ....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 ....7.75
Struthers,O. Y1 ....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ....8.10
Ind Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 ....8.05
S.Chicago,Ill. U5 ....8.05
Sterling,Ill. N15 ....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
S.Chicago Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 ....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 ....5.30
Ashland,Ky.(15) A10 ....5.30
Atlanta A11 ....5.50
Bessemer,Ala. T2 ....5.30
Clairton,Pa. U5 ....5.30
Claymont,Del. C22 ....5.30
Cleveland J5, R2 ....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 ....5.30
Fairfield,Ala. T2 ....5.30
Farrell,Pa. S3 ....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 ....5.30
Geneva,Utah C11 ....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 ....5.30
Houston S5 ....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 ....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 ....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 ....5.30
Newport,Ky. A2 ....5.30
Pittsburgh J5 ....5.30
Riverdale,Ill. A1 ....5.30
Seattle B3 ....6.20
Sharon,Pa. S3 ....5.30
S.Chicago,Ill. U5, W14 ..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 ....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 ....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.05
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 ....7.05
Houston S5 ....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ....7.95
Ashland,Ky. A10 ....7.95
Bessemer,Ala. T2 ....7.95
Clairton,Pa. U5 ....7.95
Claymont,Del. C22 ....7.95
Cleveland J5, R2 ....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 ....7.95
Ecorse,Mich. G5 ....7.95
Fairfield,Ala. T2 ....7.95
Farrell,Pa. S3 ....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 ....7.95
Geneva,Utah C11 ....7.95
Houston S5 ....8.05
Ind Harbor Ind. I-2, Y1..7.95
Johnstown,Pa. B2 ....7.95
Munhall,Pa. U5 ....7.95
Pittsburgh J5 ....7.95
Seattle B3 ....8.85
Sharon,Pa. S3 ....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 ....7.625
Warren,O. R2 ....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 ....7.50
Claymont,Del. C22 ....7.50
Coatesville,Pa. L7 ....7.50
Economy,Pa. B14 ....7.50
Farrell,Pa. S3 ....7.50
Fontana,Calif. K1 ....8.30
Gary,Ind. U5 ....7.50
Houston S5 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 ....7.50
Lowellville,O. S3 ....7.50
Munhall,Pa. U5 ....7.50
Newport,Pa. A2 ....7.50
Pittsburgh J5 ....7.50
Seattle B3 ....8.40
Sharon,Pa. S3 ....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 ....7.50

FLOOR PLATES
Cleveland J5 ....6.375
Conshohocken,Pa. A3 ..6.375
Ind Harbor,Ind. I-2 ....6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
S.Chicago,Ill. U5 ....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ....5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 ....6.05
Warren,O. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon
(Merchant Quality)
Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 ....5.875
Atlanta(9) A11 ....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 ....5.675
Canton,O.(23) R2 ....6.15
Clairton,Pa.(9) U5 ...5.675
Cleveland(9) R2 ....5.675
Ecorse,Mich.(9) G5 ...5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ...5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 ....5.675
Houston(9) S5 ....5.925
Ind Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 ....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ..5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 ....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 ....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11 6.375
Pittsburgh(9) J5 ....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15 .6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ...5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11 .6.375
Warren,O. C17 ....6.025
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ..6.80
Buffalo R2 ....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 ....6.725
Detroit S41 ....6.725
Economy,Pa. B14 ....6.725
Ecorse,Mich. G5 ....6.725
Fairless,Pa. U5 ....6.875
Farrell,Pa. S3 ....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 ....6.725
Houston S5 ....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 ....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 ....7.775
Lowellville,O. S3 ....6.725
Massillon,O. R2 ....6.725
Midland,Pa. C18 ....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 ....6.725
Seattle(6) B3 ....7.825
Sharon,Pa. S3 ....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 ....6.725
Warren,O. C17 ....6.725
Youngstown U5 ....6.725

BARS & SMALL SHAPES, H.R.
High-Strength, Low-Alloy
Aliquippa,Pa. J5 ....8.30
Bessemer,Ala. T2 ....8.30
Bethlehem,Pa. B2 ....8.30
Clairton,Pa. U5 ....8.30
Cleveland R2 ....8.30
Ecorse,Mich. G5 ....8.30
Fairfield,Ala. T2 ....8.30
Fontana,Calif. K1 ....9.00
Gary,Ind. U5 ....8.30
Houston S5 ....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 ....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 ....9.00
Pittsburgh J5 ....8.30
Seattle B3 ....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Sterling,Ill. N15 ....7.925
Struthers,O. Y1 ....8.30
Youngstown U5 ....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ...5.825
Houston(9) S5 ....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ...5.675
Sterling,Ill. N15 ....5.775
Sterling,Ill.(1) N15 ...5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ....5.675
Atlanta A11 ....5.875
Joliet,Ill. P22 ....5.675
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 ....6.375
Pittsburgh J5 ....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 ....6.52
Seattle B3 ....6.425

BAR SIZE ANGLES; S. SHAPES
Wrought Iron
Economy,Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 ....6.80
Youngstown U5 ....6.80

BARS, C.F. Loaded
(Including loaded extra)
Carbon
LosAngeles P2, S30 ..11.75*
Alloy
Ambridge,Pa. W18 ..10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 ....10.35
Chicago W18 ....10.175
Elyria,O. W8 ....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35
*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2..7.65
Birmingham C15 ....8.25
Buffalo B5 ....7.70
Camden,N.J. P13 ....8.10
Carnegie,Pa. C12 ....7.65
Chicago W18 ....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 ....7.85
Detroit S41 ....7.65
Donora,Pa. A7 ....7.65
Elyria,O. W8 ....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 ....7.65
GreenBay,Wis. F7 ....7.65
Hammond,Ind. J5, L2..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 ....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 ....7.65
Monaca,Pa. S17 ....7.65
Newark,N.J. W18 ....8.10
NewCastle Pa.(17) B4 ..7.65
Pittsburgh J5 ....7.65
Plymouth Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
Seattle(49) S30 ....9.10
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 ....7.65
Warren,O. C17 ....7.65
Waukegan,Ill. A7 ....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon
(Turned and Ground)
Cumberland,Md.(5) C19..6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa.M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 ....9.025
Camden,N.J. P13 ....9.20
Canton,O. T7 ....9.025
Carnegie,Pa. C12 ....9.025
Chicago W18 ....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 ....9.225
Detroit S41 ....9.025
Donora,Pa. A7 ....9.025
Elyria,O. W8 ....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 ....9.025
GreenBay,Wis. F7 ....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 ....9.025
Lackawanna,N.Y. B3..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 ....9.025
Monaca,Pa. S17 ....9.025
Newark,N.J. W18 ....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20
Struthers,O. Y1 ....9.025

Warren,O. C17 .....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.25
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex.(26) T4 ..5.50
Gary,Ind. U5 .....5.675
Houston S5 .....5.675
Ind.Harbor,Ind. I-2,Y1.5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ...5.675
Kokomo,Ind. C16 ....5.775
Lackawanna,N.Y. B2..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SandSprings,Okla. S5 ...5.675
Seattle A24, B3, N14...6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.35
Johnstown,Pa. B2 ....7.33
KansasCity,Mo. S5 ....7.35
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 .5.55
Marion,O.(3) P11 .....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 .....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 ....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ....7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ..6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ....6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 ....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50

SHEETS, Wall Casing

Fontana,Calif. K1 .....7.325

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1)..9.525

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 .....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

Follansbee,W.Va. W10 .7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union-Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	5.10
Allenport,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
SanFrancisco S7	6.60
Seattle(25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago,Ill. W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2, Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.525
Farrell,Pa. S3	7.425
Follansbee,W.Va. W10	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.525
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, M23	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3, N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale,Ill. A1	7.525
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Cleveland A7	15.55
Carnegie,Pa. S18	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. S18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. N8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80
Weirton,W.Va. W6	10.80
Youngstown Y1	10.80

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	...	...	...	...
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	...
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	...	...
Detroit D2	9.05	10.50	12.70	15.70	...
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	...
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	...
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	...	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	...
LosAngeles S41	11.15	12.60	14.80	...	...
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	...
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	...
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	...
NewYork W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	...	...
Fostoria,O. S1	19.05	22.15	...
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	...	...
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	8.175

STRIP, C.R., Electrogalvanized

Cleveland A7	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
NewCastle,Pa. M23	7.425*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41, Y1	7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.50
Sharon,Pa. S3	7.50

TIGHT COOPERAGE HOOP

Atlanta A11	5.825
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70 ....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
Rankin,Pa. A7	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	13.40
KansasCity,Mo. U3	12.90
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	13.50
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
Kokomo,Ind. C16	9.85
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.05
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7, J4, T6	10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Bartonville,Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Fostoria,O. S1	9.80
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Millbury,Mass.(12) N6	10.05
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7, J4, T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C16	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

ROPE WIRE (A)

Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S1	13.45
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.85
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	....	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	....	7.90	....	....
Niles,O. R2 (20-27 Ga.)	....	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (FERROLITE) (¼ lb coating in coils)

	Base Box 45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.20	$6.35	$6.50	$6.65
Fairless,Pa. U5	6.20	6.35	6.50	6.65
Gary,Ind. U5	6.10	6.25	6.40	6.55
Irvin,Pa. U5	6.10	6.25	6.40	6.55

TIN PLATE,Hot Dipped 1.25 1.50 Common Coke lb lb

Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING (Black Plate (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7, T6	12.65

NAILS, Stock Sizes

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, CUT (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. F2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa Colo. C10	178
Pittsburg Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9.02
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.34
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Co'o. C10	9.30
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa Colo. C10	9.35
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193**
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Allq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville Fla. M8	192
Johnstown,Pa.(42) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
All'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Chicago W13	17.85	....
Cleveland A7	17.85	....
Craw'sville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	9.00 9.55**
Aliquippa J5	8.65 9.325§
Atlanta(48) A11	9.00 9.75*
Bartonville(48) K4	9.85 19.90
Buffalo W12	9.00 9.55†
Chicago W13	9.00 9.55**
Cleveland A7	9.00 ....
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	9.00 9.55†
Duluth A7	9.00 9.55†
Fairfield T2	9.00 9.55†
Houston(48) S5	9.25 9.80**
Jack'ville,Fla. M8	9.10 9.80‡‡
Johnstown(48) B2	9.00 9.675§
Joliet,Ill. A7	9.00 9.55†
KansasCity(48) S5	9.25 9.80**
Kokomo(48) S16	9.10 9.65†
LosAngeles B3	9.95 10.625§
Minnequa C10	9.25 9.80**
Monessen(48) P7	8.65 9.35§
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	9.95 10.50†
Rankin,Pa. A7	9.00 9.55†
S.Chicago R2	9.00 9.55**
S.SanFran. C10	9.95 10.50**
Spar'wsPt.(48) B2	9.10 9.775§
St'ling(37)(48) N15	9.10 9.80
Struthers,O. Y1	9.00 9.65‡
Worcester,Mass. A7	9.30 9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1¼ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated. ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packaged	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:

Packaged	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:

Packaged	+ 5
Bulk	19

Through 1 in. diam., longer than 6 in.:

Packaged	+29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great. Structural ½ in., larger 12.85 ⅞ in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St. Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2¾	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	....	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.85c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2¼ in. and smaller hexagons; 9.65c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1¼		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	52.00
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	59.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	80.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates— Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.80	44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Los Angeles, and San Francisco, 10,000 lb. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	7.77	8.66	10.06	....	8.28	8.55	11.80	16.38	9.03	8.34	10.02
Birmingham	9.43	10.20	10.46	....	10.41	8.26	13.14	16.76	8.47	8.41	10.05
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.65	9.80	11.25	55.98	11.00	8.75	11.45	16.30	9.15	8.65	11.10
Charlotte, N. C.	9.87	11.22	10.30	....	10.86	9.67	12.68	....	9.88	9.82	11.46
Chicago	8.57	10.20	10.15	52.00	10.74	8.55	10.65	15.95	8.91	8.41	10.68
Cincinnati	8.74	10.26	10.20	65.30	11.06	8.87	11.53	16.27	9.47	8.79	11.01
Cleveland	8.57	9.88	11.24	56.18	10.86	8.66	11.25	16.06	9.30	8.65	10.92
Dallas	9.62	10.05	12.59	....	11.18	9.03	12.98	16.95	9.26	9.35	11.00
Detroit	8.83	10.46	10.50	52.00	11.11	8.86	11.01	16.23	9.47	8.78	10.94
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	9.22	9.65	12.19	52.00	10.78	8.63	13.10	16.55	8.86	8.95	10.60
Indianapolis	9.01	10.64	10.59	....	11.18	8.99	11.09	16.39	9.35	8.85	11.12
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	8.95	11.20	11.35	61.27	10.65	9.00	14.20	17.35	9.90	8.40	11.15
Memphis, Tenn.	9.84	10.05	....	....	10.64	9.82	12.74	....	9.16	8.66	11.41
Milwaukee	8.71	10.34	10.29	....	10.88	8.69	10.89	16.09	9.13	8.55	10.82
Moline, Ill.	8.92	10.55	10.50	....	10.90	8.90	11.15	16.45	9.26	8.76	10.96
Newark, N. J.	9.36	10.13	11.35	....	11.46	9.74	13.25	16.40	10.20	9.51	11.05
New York	9.36	10.13	11.35	52.98	11.46	9.74	13.25	16.40	10.20	9.51	11.05
Philadelphia	8.35	9.60	10.66	52.71	10.35	8.75	11.95	16.38	8.95	8.70	9.95
Pittsburgh	8.57	9.88	11.13	52.00	10.84	8.55	11.25	15.95	8.91	8.41	10.68
Portland, Oreg.	9.45	11.30	12.35	....	11.45	9.45	16.65	17.80	10.05	9.60	11.75
St. Louis	8.77	10.58	10.53	....	10.94	8.77	11.28	16.33	9.14	8.62	10.91
St. Paul	8.84	9.59	10.84	....	11.01	8.82	11.49	16.54	9.18	8.68	10.44
San Francisco	10.17	11.69	11.40	54.00	11.78	10.07	15.10	17.25	10.49	10.38	12.47
Seattle	10.51	11.57	12.50	54.02	11.95	9.94	16.20	17.80	10.65	10.10	12.73
Spokane, Wash.	10.36	11.42	12.35	54.02	11.80	9.79	16.20	17.80	10.50	9.95	12.58

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Dallas and Houston, 10 Ga. x 48 x 120 in.; stainless, 16 Ga. x 36 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ⅝ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $146; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa.; Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Vandalia, Mo., New Salisbury, Ohio, $97; Vanport, Pa., Wellsville, Irondale, Ohio, $100; Clearfield, Pa., Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $250; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Nario, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines; Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore (periclase), $73; Pascagoula, Miss. (periclase), $90.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c)	
Annealed, 99.5% Fe.	36.75, ton, del. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l.	39.80; ton lots 41.80
Brass, 80/20, leaded (60 mesh)	39.90
Bronze filter powder, 90/10	47.00*
Copper, all types	15.25*
Lead	7.50*
Manganese, minus 35 mesh	1.00
Nickel, all types	0.78-1.06
Nickel-Silver	60.70
Solder	15.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	25.90

Cobalt:	Dollars
98.5%, minus 100-300 mesh	1.57-1.58
99.5%, below 5 microns	2.32

Tungsten:	Dollars
Carbon and hydrogen reduced, 98.8% min., minus 65 mesh	nom.**
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes*	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.75	....	$5.65	$5.50	$5.85
Bar Size Angles	5.95	....	5.85	5.70	6.05
Structural Angles	5.95	....	5.65	5.50	5.85
I-Beams	5.70	....	5.60	5.45	5.80
Channels	5.70	....	5.60	5.45	5.80
Plates (basic bessemer)	5.85	....	5.75	5.60	5.95
Sheets, H.R.	Nom.	....	Nom.	Nom.	Nom.
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	Nom.	....	Nom.	Nom.	Nom.
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.50	....	24.70	24.70	25.50
Barbed Wire (†)	6.25	....	6.15	6.00	6.35
Merchant Bars	5.95	....	5.85	5.70	6.05
Hot-Rolled Bands	6.20	....	6.10	5.95	6.30
Wire Rods, Thomas Commercial No. 5	6.40	....	6.20	6.20	6.60
Wire Rods, O. H., No. 5	6.55	....	6.35	6.35	6.70
Bright Common Wire Nails (‖)	7.25	....	7.15	7.00	7.35

*Books closed for 1960-61 shipping season. †Per 82 lb net reel. ‖Per 100-lb keg, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Lump ⅛ in. and up	12.85
Fines, under ⅛ in.	10.72
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	23.00†
Chilean, 62-65%, c.i.f. Atlantic ports	22.00
Brazilian, 68.5%, f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$19.75-20.00
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-58%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75†
48% no ratio	24.00-26.00†

Turkish

48% 3:1	36.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
55-60%	$2.50-2.80
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.35
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per net ton bulk, f.o.b. cars or truck, plant.	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa. 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn $98. For Neville Island, Pa., prices add $2.50 as of Feb. 1. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va., Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Min 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 50-56%, C 6-8%, Si 4-7%, 22.00c; Cr 58-63%, C 5-8%, Si 3-6%, 22.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 53-63%, C 3-5%, Si 2.5% max, 26.00c per lb of contained Cr, delivered in carlots, lump, bulk.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 33.50c per lb contained Cr; 0.010% max, 34.50c. Delivered.

Cr, 65-71%, carload, lump, bulk, 0.025% max, 35.00c; 0.05% max, 34.00c; 0.10% max, 33.75c; 0.20% max, 33.50c; 0.50% max, 33.25c; 1.0% max, 33.00c; 1.5% max, 32.75c; 2.0% max, 32.50c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l. 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). SM x D, carload, bulk, 20.05c per lb of alloy carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 24.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 24.50c per lb contained Cr, 14.60c per lb contained Si; 0.75 in. x down, 26.25c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-77% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20% per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

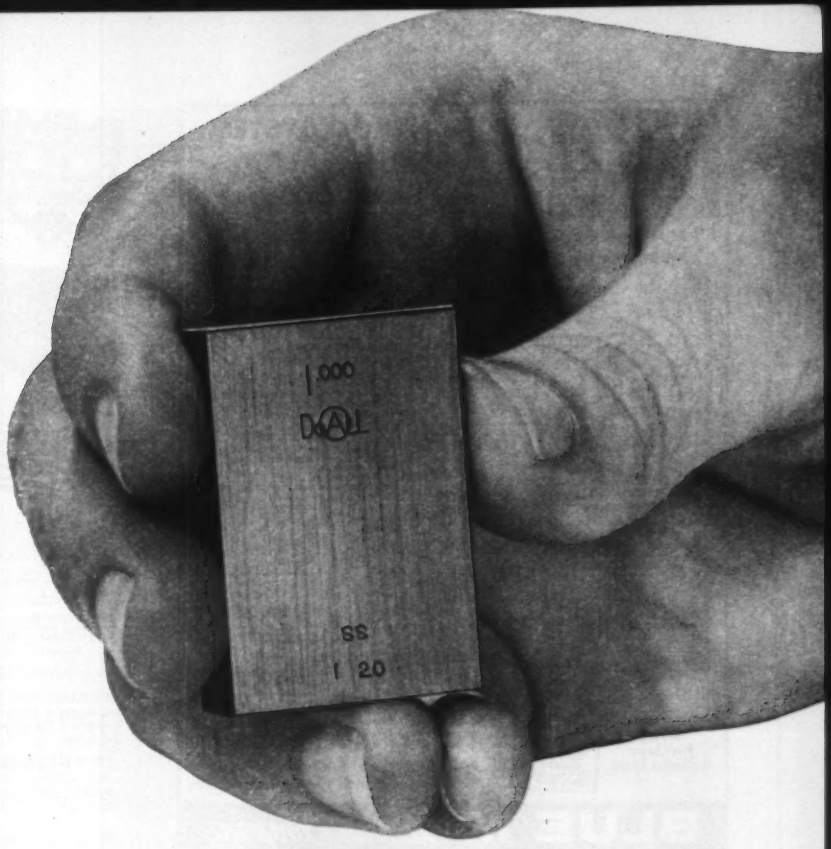
Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

DoALL tells how Lindberg equipment helps produce stainless steel gage blocks



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DoALL

Norman Silver, Chief Metallurgist, and Lindberg Vertical Tempering Furnace at DoALL Company.

NORMAN SILVER, Chief Metallurgist says, "Our Lindberg equipment supplies the uniformity of heat distribution and the fast accurate control that is needed for the exacting requirements of our product. The furnace responds to control almost instantaneously and maintains the temperature within plus or minus 5°. Its 38" diameter by 36" depth handles 200 to 300 pound loads for the desired production. Results obtained have satisfied us completely with this, the latest of our Lindberg furnaces".

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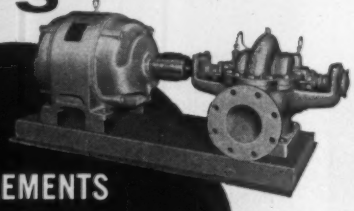

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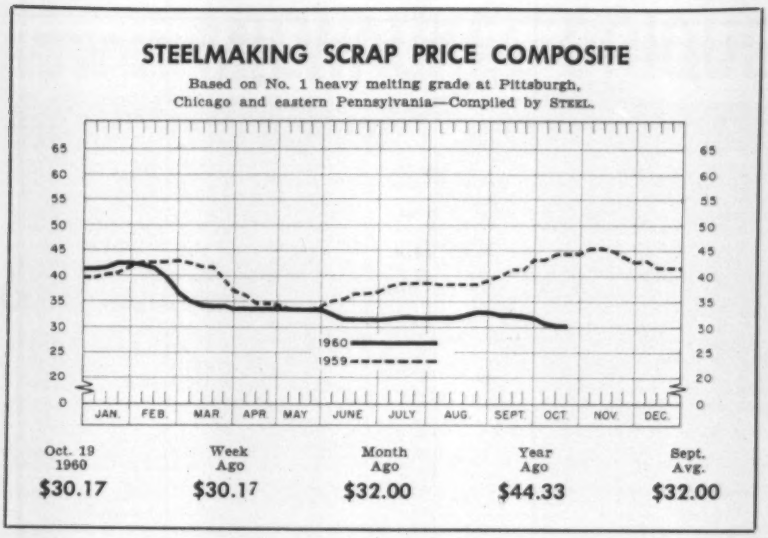

Scrap Prices Lack Buying Test

Market tone continues weak at most consuming points, with domestic demand held to a minimum. Exports from East and West Coast ports provide some support

Scrap Prices, Page 154

• **Chicago**—Prices are unchanged in an untested market. With the steelmaking rate failing to gain in a month that earlier had been tagged for market improvement, mills are virtually out of the market for dealer offerings. Inventories are comfortable. One mill offered $28 for No. 1 industrial heavy melting and $26 for No. 1 dealer heavy melting, but those prices aren't arousing any interest. Electric furnace and foundry grades are also unchanged. One foundry paid $43 for drop broken machinery, $1 above the generally recognized market level, but the specifications were somewhat above the average for the grade.

• **Philadelphia** — Prices on open hearth scrap are partially sustained by export demand. There was a substantial drop in September shipments from this point (around 25,000 tons), but the October movement has been up appreciably, with the final total depending upon whether a cargo that is now being loaded clears the port before the end of the month.

Reduction of $1 or so has been noted in some of the smaller tonnage items.

• **Pittsburgh** — Prices are fluctuating as traders try to guess whether demand for steel will pick up this quarter. Disappointment over the business outlook has caused one regular buyer of No. 2 bundles to back out of the market temporarily. The Pennsylvania Railroad sold its No. 1 heavy melting scrap for $34.15 a ton, about $4 a ton less than it got last month. Prices of other railroad items dropped about $3 a ton on the average.

• **New York** — Domestic trading continues sluggish, and while prices on the major grades are unchanged, the market on some items is purely nominal. Export demand is sustaining prices on the open hearth grades and is bolstering steel scrap in general.

• **Cleveland**—The steelmaking rate is discouraging hopes for a substantial pickup in scrap demand the remaining months of this year. Quoted prices are largely nominal in the absence of representative mill buying, and some traders express the fear that the market has not yet touched bottom.

• **Detroit** — The market continues soft. Dealers say the increasingly large tonnages being generated by the auto plants, coupled with lack of mill demand, will make for another drop in prices when month-end auto lists come out for bids.

• **Buffalo**—Prices appear to be stabilized, with dealers shipping against October mill orders. Supplies are ample, and demand is light. One district mill is taking scrap in sizable tonnage, but the mills, in general, are well supplied and are not showing any concern over their winter supplies.

• **Cincinnati**—The market is at a standstill, with prices largely nominal. No. 1 heavy melting is quoted unchanged at $24.50-$25.50, and the prospects for an early upturn are not promising.

• **St. Louis**—The market shows little change from a week ago. Mills and foundries continue to take in only small tonnages. Prices are unchanged, but they are largely untested.

• **Birmingham** — Demand is slipping, and the outlook for an early upturn is not promising. Electric furnace material (3 ft and under) is quoted down $1 a ton from a week ago, and so is No. 1 railroad heavy melting.

• **Houston**—Prices declined on several grades last week when a local mill placed an order that provided the first real test of prices in weeks.

(*Please turn to Page* 159)

FOR SALE

One new Electric Arc Furnace Charging Bucket Including Bale
Type: Cable Operated—Clamshell
Capacity: 1486 Cu. ft. = 55 tons
Max Dia Closed: 17'-9"
Max Dia Opened: 18'-8"
Max Dia Bottom Opening 12'-6"
Distance from Eye of Bale to Bottom of Bucket Open and closed 14'-0"
Weight: 48,000 lbs.

Reply to Box #875, STEEL
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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Oct. 19, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Oct. 19	$30.17
Oct. 12	30.17
Sept. Avg.	32.00
Oct. 1959	44.00
Oct. 1955	45.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	24.00-25.00
No. 1 dealer bundles	*30.00-31.00*
No. 2 bundles	*23.00-24.00*
No. 1 busheling	*29.00-30.00*
No. 1 factory bundles	*34.00-35.00*
Machine shop turnings	13.00-14.00
Mixed borings, turnings	13.00-14.00
Short turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals:	
2 ft and under	34.00-35.00
3 ft and under	33 00-34.00
Heavy turnings	27.00-28.00
Punchings & plate scrap	36.00-37.00
Electric furnace bundles	*34.00-35.00*

Cast Iron Grades

No. 1 cupola	36.00-37.00
Stove plate	32.00-33.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	36.00-37.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	*34.00-35.00*
Rails, 2 ft and under	48.00-49.00
Rails, 18 in. and under	49.00-50.00
Random rails	44.00-45.00
Angles, splice bars	*40.00-41.00*
Railroad specialties	38.00-39.00
Rails, rerolling	53.00-54.00

Stainless Steel Scrap

18-8 bundles & solids	175.00-180.00
18-8 turnings	95.00-100.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

CHICAGO

No. 1 hey melt., indus.	29.00-30.00
No. 1 hvy melt., dealer	26.00-27.00
No. 2 hvy melting	24.00-25.00
No. 1 factory bundles	31.00-32.00
No. 1 dealer bundles	27.00-28.00
No. 2 bundles	16.00-17.00
No. 1 busheling, indus.	28.00-30.00
No. 1 busheling, dealer	26.00-27.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	13.00-14.00
Shovel turnings	13.00-14.00
Cast iron borings	13.00-14.00
Cut structurals, 3 ft.	30.00-31.00
Punchings & plate scrap	32.00-33.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Stove plate	30.00-31.00
Unstripped motor blocks	28.00-29.00
Clean auto cast	41.00-42.00
Drop broken machinery	41.00-42.00

Railroad Scrap

No. 1 R. R. heavy melt.	30.00-31.00
R.R. malleable	40.00-41.00
Rails, 2 ft and under	42.00-43.00
Rails, 18 in. and under	43 00-44.00
Angles, splice bars	37.00-38.00
Axles	*48.00-49.00*
Rails, rerolling	*47.00-49.00*

Stainless Steel Scrap

18-8 bundles, solids	160.00-165.00
18-8 turnings	80.00-85.00
430 bundles & solids	80.00-85.00
430 turnings	40.00-45.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	21.00-22.00
No. 2 heavy melting	16.00-17.00
No. 1 bundles	23.00-24.00
No. 2 bundles	13.00-14.00
No. 1 busheling	20.00-21.00
Machine shop turnings	7.00-8.00
Mixed borings, turnings	9.00-10.00
Shovel turnings	9.00-10.00

Cast Iron Grades

No. 1 cupola	31.00-32.00
Stove plate	25.00-26.00
Heavy breakable	25.00-26.00
Unstripped motor blocks	19.00-20.00
Charging box cast	25.00-26.00
Clean auto cast	40.00-41.00

CLEVELAND

No. 1 heavy melting	*25.00-26.00*
No. 2 heavy melting	*19.00-20.00*
No. 1 factory bundles	30.00-31.00
No. 1 bundles	*25.00-26.00*
No. 2 bundles	16.00-17.00
No. 1 busheling	*25.00-26.00*
Machine shop turnings	10.00-11.00
Shovel turnings	14.00-15.00
Mixed borings, turnings	14.00-15.00
Cast iron borings	14.00-15.00
Cut foundry steel	*29.00-30.00*
Cut structurals, plate 2 ft and under	*32.00-33.00*
Low phos. punchings & plate	*27.00-28.00*
Alloy free, short shovel turnings	14.00-15.00
Electric furnace bundles	*26.50-27.50*

Cast Iron Grades

No. 1 cupola	40.00-41.00
Charging box cast	29.00-30 00
Heavy breakable cast	26.00-27.00
Stove plate	*34.00-35.00*
Unstripped motor blocks	28.00-29.00
Brake shoes	35.00-36.00
Clean auto cast	*43.00-44.00*
Burnt cast	34.00-35.00
Drop broken machinery	44.00-45.00

Railroad Scrap

R.R. malleable	45.00-46.00
Rails, 2 ft and under	46.00-47.00
Rails, 18 in. and under	47.00-48.00
Rails, random lengths	40 00-41.00
Cast steel	32.00-33.00
No. 1 railroad cast	43.00-44.00
Railroad specialties	37.00-38.00
Angles, splice bars	39 00-40.00
Rails, rerolling	51.00-52.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	160 00-165.00
18-8 turnings	70.00-75.00
430 clips, bundles, solids	75.00-80.00
430 turnings	20.00-30.00†

YOUNGSTOWN

No. 1 heavy melting	*27.00-28.00*
No. 2 heavy melting	*20.00-21.00*
No. 1 busheling	*27.00-28.00*
No. 1 bundles	*27.00-28.00*
No. 2 bundles	*17.00-18.00*
Machine shop turnings	12.00-13.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Low phos.	*27.00-28.00*
Electric furnace bundles	*27.00-28.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*29.00-30.00*

BUFFALO

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	27 00-28.00
No. 2 bundles	19.00-20.00
No. 1 busheling	27.00-28.00
Shovel turnings	15.00-16.00
Machine shop turnings	11.00-12.00
Cast iron borings	13.00-14.00
Low phos. structurals and plate, 2 ft and under	35.00-36.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	39.00-40.00
No. 1 machinery	46.00-47.00

Railroad Scrap

Rails, random lengths	39.00-40.00
Rails, 3 ft and under	45.00-16.00
Railroad specialties	38.00-39.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	24.50-25.50
No. 2 heavy melting	20.50-21.50
No. 1 bundles	24.50-25.50
No. 2 bundles	16.00-17.00
No. 1 busheling	24.50-25.50
Machine shop turnings	8.00-9.00
Mixed borings, turnings	8.00-9.00
Shovel turnings	11.00-12.00
Cast iron borings	11.00-12.00
Low phos. 18 in.	33.00-34.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Heavy breakable cast	29.00-30.00
Charging box cast	35.00-36.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	30.00-31.00
Rails, 18 in. and under	46 00-47.00
Rails, random lengths	*38.00-39.00*

PHILADELPHIA

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	36.00
No. 2 bundles	21.00
No. 1 busheling	36.00
Electric furnace bundles	37.00
Mixed borings, turnings	17.00†
Shovel turnings	*20.00*
Machine shop turnings	15.00
Heavy turnings	28.00†
Structurals & plates	38.00-40.00
Couplers, springs, wheels	*39.00*
Rail crops, 2 ft & under	*48.00-50.00*

Cast Iron Grades

No. 1 cupola	39.00
Heavy breakable cast	38.00
Drop broken machinery	*48.00-49.00*
Malleable	46.00†

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	30.00-31.00
No. 2 bundles	16.00-17.00
Machine shop turnings	6.00-700†
Mixed borings, turnings	7.00-8.00†
Shovel turnings	8.00-9.00†
Low phos. structurals & plates	33.00-34.00†

Cast Iron Grades

No. 1 cupola	36.00-37.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	30.00-31.00

Stainless Steel

18-8 sheets, clips, solids	155.00-160.00
18-8 borings, turnings	80.00-85.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	*60.00-65.00*

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	24.00-25.00
No. 2 heavy melting	20.00-21.00
No. 1 bundles	24.00-25.00
No. 1 busheling	24.00-25.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	30.00-30.50
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	30 00-31.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	29.00-30.00
No. 2 bundles	20.00-21.00
No. 1 busheling	31.00-32.00
Cast iron borings	10.00-11.00
Machine shop turnings	17.00-18.00
Shovel turnings	19.00-20.00
Bar crops and plate	36.00-37.00
Structurals & plate	36.00-37.00
Electric furnace bundles	31.00-32.00
Electric furnace:	
3 ft and under	*34.00-35.00*
2 ft and under	35.00-36.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Stove plate	47.00-48.00
Unstripped motor blocks	35.00-36.00
No. 1 wheels	37.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt.	*33.00-34.00*
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	39.00-40.00
Angles, splice bars	37.00-38.00

ST. LOUIS

(Brokers' buying prices)

No. 1 busheling	30.00
No. 2 heavy melting	26.00
No. 1 bundles	30.00
No. 2 bundles	19.00
No. 1 busheling	*30.00*
Machine shop turnings	7.50
Shovel turnings	9.50

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	35.00
Heavy breakable cast	33 00
Unstripped motor blocks	35.00
Clean auto cast	42.00
Stove plate	36.00

Railroad Scrap

No. 1 R.R. heavy melt.	30.00
Rails, random lengths	36.00
Rails, rerolling	50.00
Rails, 18 in. and under	39.00
Angles, spiire bars	36.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	34.00†
No. 2 heavy melting	*29.00*
No. 1 bundles	32.00
No. 2 bundles	*18.00-19.00†*
Machine shop turnings.	nom.
Low phos. plate & structurals:	
3 ft	*35.00*
2 ft and under	38.00-39.00

Cast Iron Grades

No. 1 cupola	34.00-34.50
Heavy breakable	25.00
Foundry malleable	*29.00-30.00†*
Unstripped motor blocks	28.00-28.50

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00

LOS ANGELES

No. 1 heavy melting	30.00*
No. 2 heavy melting	27.00†
No. 1 bundles	25.00*
No. 2 bundles	*19.00**
Machine shop turnings	*12.00†*
Shovel turnings	13.00†
Cast iron borings	13.00†
Cut structurals and plate 1 ft and under	44.00†

Cast Iron Grades

No. 1 cupola	39.00-44.00†

Railroad Scrap

No. 1 R.R. heavy melt.	*40.00†*

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	39.00
No. 2 heavy melting	36.00
No. 2 bundles	21.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable	33.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	38.50
No. 2 (prepared for shears)	30.00
No. 1 hvy (unprepared)	35.00
No. 2 heavy melting	35.50
No. 2 hvy (unprepared)	33.00
No. 1 (prepared for shears)	33.00
No. 2 bundles	23.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable cast	36.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	*32.00*
No. 2 heavy melting	29.00
No. 1 bundles	27.00-28.00
No. 2 bundles	18.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	*46.00-48.00*
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	*45.00-46.00*
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	25.80
No. 2 hvy melt, 2 ft & under	25.50
No. 1 bundles	25.80
No. 2 bundles	19.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Busheling, new factory: Prepared	25.50
Unprepared	20.45
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	43.00

*For export add $4 dock charges.
†Nominal.
‡F.o.b. Hamilton, Ont.

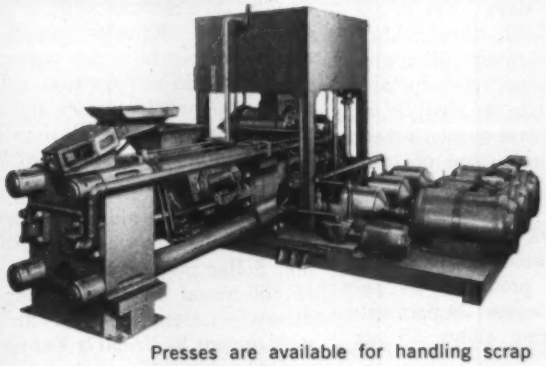
the all-new MILWAUKEE BRIQUETTING PRESS

8818-SI

Chips, turnings and borings are converted rapidly and economically into dense cylindrical briquettes that are classified as high grade scrap.

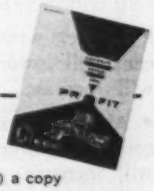
converts scrap into PROFIT!

Briquetting is a proved and practical method of salvaging almost every type of machine shop scrap. Savings are realized in three major ways. (1) Metal loss is reduced to a minimum . . . AND your up-graded scrap recovery value is like money in your pocket. (2) Working and storage areas throughout your entire plant can be put to better use. (3) Quality and production control profit because you can re-use non-contaminated metals of known analysis.



Presses are available for handling scrap volumes from ¾ to more than 9 tons per hour. Milwaukee engineers will evaluate your individual requirements.

Just off the press . . . Bulletin BP-217 is yours for the asking. Complete with specifications, illustrations and photos.



SPO, Inc.
Milwaukee Foundry Equipment Div.
1403 W. Bruce Street
Milwaukee 46, Wisconsin

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WORLD'S LARGEST SUPPLIERS OF MOLDING MACHINES — SPO

MILWAUKEE *Foundry Equipment Division*

Users to Continue Inventory Cutbacks

STEEL's survey finds: Nonferrous customers will continue to prune inventories through 1961's first quarter. More consumers aiming at stocks of 10 days or less

Nonferrous Metal Prices, Pages 158 & 159

INVENTORY WORKOFF, far from being just about over, may accelerate over the remainder of this quarter and through the first three months of 1961, hindering chances for any substantial pickup in sales. While it's true many user inventories are at rock bottom, most consumers aren't operating on such a close basis that orders are needed "yesterday" to keep production lines rolling, as is believed by many metalmen.

• **Stocks Being Sliced**—A nationwide survey of purchasing agents just completed by STEEL turns up these facts: During this quarter 44 per cent of the copper and copper base alloy users are reducing stocks while only 6 per cent are building them up; 38 per cent of copper wire and cable consumers are cutting back, while 6 per cent are replenishing; 40 per cent of the aluminum mill products users are trimming vs. 7 per cent who are building; aluminum ingot stocks are being cut by 29 per cent while 14 per cent are adding; and 50 per cent of the zinc alloy diecasting customers are trimming, virtually none are adding.

Here's what users intend to do with their nonferrous inventories in 1961's first quarter:

• Copper and copper base alloys—33 per cent will lower stocks, 6 per cent will increase.

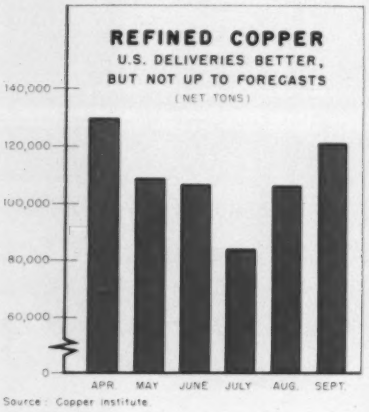
• Copper wire and cable—19 per cent will lower stocks, 13 per cent will increase.

• Aluminum mill products—26 per cent will lower stocks, 18 per cent will increase.

• Aluminum ingots—13 per cent will lower stocks, 13 per cent will increase.

• Zinc diecasting alloys—20 per cent will lower stocks, 20 per cent will increase.

• **Where Stocks Will Stand**—The inventory reductions add up to this: In the fourth quarter, 12 per cent of the copper and brass users and 6 per cent of the aluminum users will hold working stocks that would last less than 10 days. But in the first quarter of 1961, those holding less than 10 days supply will double for copper and brass, triple for aluminum, and move up sharply for zinc. Here's the first quarter breakdown on the percentage of companies that plan to lower inventories to less than 10 days: Copper and copper base alloys, 23 per cent; copper wire and cable, 23 per cent; aluminum mill products, 16 per cent; aluminum ingots, 29 per cent; and zinc diecasting alloys, 33 per cent.



• **Effect on Sales**—Inventory reduction won't have a healthy effect on sales. But just how much impact further workoff has on demand and prices depends on how the economy moves.

There has been some gain in the copper market since the metal went to 30 cents a pound and corresponding cuts were made in brass and wire mill products, brass ingots, and copper anodes. And copper statistics released soon after copper's drop were better than expected. They showed shipments of domestic refined copper in September hit 120,585 tons for the best month since April. Refined production dropped 10,000 tons and producers' stocks came down 13,000.

World overproduction still remains copper's big problem. Recent production cuts in Africa and the continuation of the strike at Anaconda Co.'s giant Chucaquimata properties in Chile help but don't solve the overproduction dilemma.

The outlook depends on how well buyers react to the 30 cent a pound price. For the time being, prices should be stable. But if demand for custom smelted copper doesn't pick up over the next six weeks, you can look for that price to fall further.

Aluminum Co. of America's chairman, Frank L. Magee, believes that user aluminum inventories are still high but will be pretty well worked off by yearend. Kaiser Aluminum & Chemical Corp.'s president, D. A. Rhoades, points out that aluminum sales this year of an estimated 2.35 million tons will be the second best in history and only 4 per cent under the all-time high of 2.45 million tons hit in 1959.

• **Projects**—The aluminum industry continues to tackle multimillion dollar projects to promote use of the metal in the building industry. Latest move is an announcement by Webb & Knapp Inc. and Aluminum Co. of America that they will team up to build a $40 million apartment-commercial development adjacent to the United Nations headquarters in New York. Within the last few weeks, the two firms have announced similar cooperative ventures in Los Angeles and Pittsburgh.

DEPENDABILITY of shifter fork improved by designing it to be FORGED

Modern board forging hammer

By designing the shifter fork of his transmission to be forged, a manufacturer of earthmovers eliminated costly equipment breakdowns in the field because of fork failure. Factor of safety was *in*creased even while weight and over-all costs were being *de*creased.

Parts scrapped because of voids uncovered after much high-cost machining are eliminated . . . forgings are *naturally* sound all the way through. Forgings start as *better* metal . . . are further *improved* by the compacting hammer-blows or high-pressure of the forging process.

Design your parts to be forged . . . increase strength/weight ratio, reduce as-assembled cost, improve performance. Literature to help you design, specify, and procure forged parts is available on request.

When it's a vital part, design it to be FORGED

Drop Forging Association • Cleveland 13, Ohio

Names of sponsoring companies on request to this magazine

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 31.50; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.50-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.60 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 30.00 deld.; custom smelters, 30.00; lake, 30.00 deld.; fire refined, 29.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis. New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld.; 24-99 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $208-210 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 75.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.50-5 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot, 103.25; prompt, 103.125.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.10.

Zinc: Prime western, 13.00; brass special, 13.25; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 14.35; special high grade, 14.50 deld. Diecasting alloy ingot No. 3, 16.25; No. 2, 16.75; No. 5, 16.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8-8.50 per lb; 100-500 lb, $7.25-7.50 per lb; 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.00-26.00; No. 12 foundry alloy (No. 2 grade), 22.75; 5% silicon alloy, 0.60 Cu max., 24.00; 13 alloy, 0.60 Cu max., 24.00; 195 alloy, 25.75; 108 alloy, 23.25. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.50; grade 3, 21.50; grade 4, 21.00.

Brass Ingot: Red brass, No. 115, 28.25; tin bronze, No. 225, 38.00; No. 245, 32.50; high-leaded tin bronze, No. 305, 32.75; No. 1 yellow, No. 405, 23.50; manganese bronze, No. 421, 27.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.945, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.945, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 35.35; l.c.l., 35.98. Weatherproof, 20,000-lb lots, 36.30; l.c.l., 37.05.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-69.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-114	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths

Diam	Round		Hexagonal	
(in.)*	2011-T3	2017-T4	2011-T3	2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90.000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.60
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	94.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire 23.00-23.50; No. 2 heavy copper and wire, 21.25-21.75; light copper, 18.75-19.25; No. 1 composition red brass, 18.50-19.00; No. 1 com-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	SCRAP ALLOWANCES e (Based on copper at 30.00c) Clean Heavy	Rod End-s	Clean Turnings
Copper	54.13b	51.86c	....	55.32	26.000	26.000	25.250
Yellow Brass	48.77	34.38d	49.06	52.43	20.375	19.625	18.625
Low Brass, 80%	51.25	50.94	51.54	54.81	22.500	22.250	21.750
Red Brass, 85%	52.12	51.81	52.41	55.68	23.250	23.000	22.500
Com. Bronze, 90%	53.53	53.22	53.82	56.84	24.000	23.750	23 250
Manganese Bronze	57.27	50.71	61.19	....	19.250	19.000	18.375
Muntz Metal	51.64	46.70	....	....	19.175	19.125	18.625
Naval Brass	53.58	47.14	59.89	57.24	19.125	18.875	18.375
Silicon Bronze	59.96	58.90	59.25	77.89	25.500	25.250	24.500
Nickel Silver, 10%	64.18	66.26	66.26	....	25.125	24.875	12.562
Phos. Bronze, A-5%	74.70	75 45	71.95	76.63	27.125	26.875	25.875

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 17.50-18.00; new brass clippings, 15.50-16.00; light brass, 12.50-13.00; heavy yellow brass, 13.50-14.00; new brass rod ends, 14.50-15.00; auto radiators, unsweated, 14.00-14.50; cocks and faucets, 15.50-16.00; brass pipe, 15.50-16.00.

Lead: Soft scrap lead, 7.75-8.00; battery plates, 3.00; linotype and stereotype, 9.00-9.50; electrotype, 8.00-8.25; mixed babbitt, 9.50-10.00.

Monel: Clippings, 23.00-24.00; old sheets, 22.00-23.00; turnings, 16.50-17.50; rods, 22.00-23.00.

Nickel: Sheets and clips, 50.00-51.00; rolled anodes, 50.00-51.00; turnings, 39.00-41.00; rod ends, 50.00-51.00.

Zinc: Old zinc, 3.00-3.50; new diecast scrap, 4.25-4.50; old diecast scrap, 2.75-3.00.

Aluminum: Old castings and sheets, 11.50-12.00; clean borings and turnings, 6.00-6.50; segregated low copper clips, 13.50-14.00; segregated high copper clips, 12.50-13.00; mixed low copper clips, 13.00-13.50; mixed high copper clips, 12.50-13.00.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 10.00-10.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 13.50-14.00; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.00; clean borings and turnings, 8.50; segregated low copper clips, 14.00; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 56.00; light scrap, 51.00; turnings and borings, 36.00.
Copper and Brass: No. 1 heavy copper and wire, 24.25; No. 2 heavy copper and wire, 22.75; light copper, 20.50; refinery brass (60% copper) dry copper content, 20.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 24.25; No. 2 heavy copper and wire, 22.75; light copper, 20.50; No. 1 composition borings, 19.75; No. 1 composition solids, 20.25; heavy yellow brass solids, 15.50; yellow brass turnings, 14.25; radiators, 16.25.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 47.04; oval, 43.50. 5000-10,000 lb; electrodeposited, 39.00. 2000-5000 lb lots; cast, 41.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29 999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 121.50; 200-499 lb, 120 00; 500-999 lb, 119.50; 1000 lb or more, 119.00.

Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30 50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.25; 2000-5900 lb, 13.25; 6000-11,900 lb, 13.00; 12,000-22,900 lb, 12.75; 23,000 lb or more, 12.25.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42 00; 400-4900 lb, 40 00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60

Sodium Stannate: Less than 100 lb, 80.10; 100-600 lb, 70.70; 700-1900 lb, 68.00; 2000-9900 lb, 66.10; 10,000 lb or more, 64.80.

Stannous Chloride (Anhydrous): 25 lb, 155.60; 100 lb, 150 70; 400 lb, 148.30; 800-19,900 lb, 107.40; 20,000 lb or more, 101.30.

Stannous Sulphate: Less than 50 lb, 140.70; 50 lb, 110.70; 100-1900 lb, 108.70; 2000 lb or more, 106.70.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb 57.00

(*Concluded from Page* 153)

No. 2 heavy melting is quoted at $29, off $2 a ton. For the first time in months, No. 1 bundles are being offered at $32.

• **Los Angeles**— Supplies are so heavy and demand is so restricted that scrapmen fear they'll have a heavy surplus at yearend. Japanese orders for the last quarter are smaller.

• **Seattle** — Consumption continues restricted, and inventories remain heavy. Exports are providing a little market support. Another full cargo for Japan is being loaded in the Seattle-Tacoma area, and there is some overseas activity at Portland, Oreg.

• **San Francisco**—The market continues easy in this area; last week No. 1 heavy melting steel was marked down another $1 per ton.

Scrapmen Start Fight on Proposed Rail Rate Hike

Scrapmen are protesting an application by the railroads for increased freight rates. In a notice filed with the Interstate Commerce Commission, the Institute of Scrap Iron & Steel asks suspension of the application. In a separate action, the St. Louis chapter of the institute, has petitioned for suspension of a switching rate increase.

The scrap institute protests requested increases in line-haul rates, switching rates, minimum car charges, and a proposal to reduce free time at ports. The move is in addition to prior action by the institute and 360 member companies, taken in a complaint with the ICC against "excessive freight rates for the hauling of scrap by 49 roads in Eastern Territory."

Among other items, the railroads, in their request for an across-the-board commodity rate hike, seek an increase of about 11 cents per gross ton up to $13, and 22 cents a ton on rates over $13. Switching rates would be increased $7.50 per car. Free time at ports would be cut from seven to five days. Some weighing and service charge increases are also sought.

The institute's statistical exhibit on scrap vs. iron ore, cites data involving revenue return, consumption, prices, and freight rates. Generally, it maintains, iron ore rates are one-third to one-fourth those charged for scrap.

Stocks of Scrap and Pig Iron Slip During August

Stocks of scrap in consumers' hands at the end of August totaled 8,607,000 gross tons, down slightly from the 8,660,983 tons held at the end of July, reports the Bureau of Mines. Pig iron stocks were 3,305,000 tons vs. 3,354,970 tons.

Consumption of scrap in August amounted to 4,182,000 tons vs. 3,678,127 in the preceding month. Pig iron consumption was 4,124,000 tons against 3,887,909 tons. August was the first month since January when scrap use outstripped pig iron in the metallics melt.

Scrap available for consumption in the month totaled 4,125,000 tons, of which 2,531,000 tons were home produced, and 1,594,000 tons were purchased material (excluding 119,000 tons shipped, transferred, or otherwise disposed of in the month).

Pig Iron . . .

Pig Iron Prices, Page 148

With foundries operating below normal, the call for merchant iron is light.

A slight pickup is reported in New England, although consumers

CLASSIFIED

Help Wanted

GENERAL MANAGER FOR SMALL STEEL ROLLING MILL—Broad experience. Age 35 to 50. Salary open. All replies confidential. Submit resume of experience to Box 877, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

SALES REPRESENTATIVE—6 years experience in carbon & alloy steel plate. B.A. degree. Seek field or staff sales position. Will relocate. Reply to Box 878, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED RATES

All classifications other than "Position Wanted" set solid, 50 words or less $18.00, each additional word .36; all capitals, 50 words or less $21.00, each additional word .45; all capitals leaded, 50 words or less $25.00, each additional word .55. "Position Wanted" set solid, 25 words or less $5.00, each additional word .20; all capitals, 25 words or less $6.50, each additional word .26; all capitals leaded 25 words or less $8.00, each additional word .32. Keyed address takes seven words. Cash with order necessary on "Position Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

BLANKET PROTECTION!

New Thermoseal® insulation for all A. O. Smith fractional and integral hp motors

And you pay no more for this across-the-board protection — a perfectly balanced combination of slot and phase insulation, magnet wire and insulation varnish. Accommodates greater temperature rise, resulting in extended life and dependable operation under the most severe operating conditions. Write today for full facts on Thermoseal.

A.O.Smith CORPORATION
ELECTRIC MOTORS
Tipp City, Ohio

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New concept in power feeds

Rockwell announces a new line of Delta 20" Power Feed Drill Presses with a totally different concept: fitting the mechanical control movements of the machine to the natural, easy motion of the operator's hand. This makes possible a simple, low cost method of increasing productivity and improving drilling quality.

Such an advanced development in mechanical power feeds offers advantages *never before available* on a standard drill press—up front control for effortless one hand operation; infinitely adjustable drill point pressure; and a built-in feature for remote control or interlocking with automation devices. Write for free brochure on floor, bench, overhead and multiple-spindle models. Rockwell Manufacturing Company, Delta Power Tool Division, 638K N. Lexington Ave., Pittsburgh 8, Pa.

are not building inventories. Demand from area machine tool manufacturers is moderately heavier, and textile equipment shops continue to melt above the average.

Trading on a barter basis, an Eastern pig iron producer recently shipped 6000 tons to Sweden; another shipment of 8000 tons for the same destination is scheduled to leave Philadelphia soon. Additional tonnages are said to be scheduled for shipment to Italy over coming months.

Distributors . . .

Prices, Page 148

Steel service centers expect total bookings this month to be a shade better than their September volume, due largely to the extra working day. The bulk of activity is in sheets and strip. Inventories are well balanced, in part reflecting prompt mill shipments.

Some price cutting continues. It's largely in the form of concessions by the smaller interests in an effort to move stocks at a faster clip. Imports are a headache.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 144

Order backlogs are heavier in concrete rebars than in most carbon steel product categories, but mill and fabricating capacity is sufficient to meet demand and delivery promises. Competition is keen, and prices are weak at some points. In New England, the bulk of tonnage on fabricator-distributor books is at prices under 8.15 cents per pound, the listed quotation of fabricators. The mill price is firmer compared with that of distributors.

Steel Bars . . .

Bar Prices, Page 143

Some producers of hot rolled carbon bars report October sales the best since June. But the extent of the improvement is small, and there is some concern as to whether November will show a further gain.

It's uncertain whether prices will go up Dec. 1 to offset a wage hike at that time. However, consumers aren't hedging against an increase, and it's felt that if sales improve the next few weeks, it will be because of auto requirements and resumption of buying by small users who have cut their inventories to the bone.

Advertising Index

Accurate Gear Works 152
Accurate Perforating Co. 152
American Chain & Cable Co., Inc., Wright Hoist Division 50
American Nickeloid Co. 27
American Steel & Wire Division, United States Steel Corporation 17, 18, 19, 46, 47
American Welding & Mfg. Co., The 52
Amsler Morton Co., Division of Textron, Inc. 20
Armco Steel Corporation 60, 61
Atlas Car & Mfg. Co. 10

Basic, Inc. 37, 38, 39, 40, 41, 42
Basic Products Corporation, Hevi-Duty Electric Co. Division 57
Behr-Manning Co., A Division of Norton Co. 45
Bethlehem Steel Co. 1
Blue M Electric Co. 152
Borg-Warner Corporation, Ingersoll Steel Division 3
Buffalo Forge Co. 43
Bullard Co., The 78

Cattie, Joseph P., & Brothers, Inc. 152
Century Electric Co. 31
Chase Brass & Copper Co. 48, 49
Chicago Steel Service Co. 82
Cleveland Tramrail Division, The Cleveland Crane & Engineering Co. 26
Colorado Fuel & Iron Corporation, The 51
Columbia-Geneva Steel Division, United States Steel Corporation 17, 18, 19, 46, 47
Cone-Drive Gears Division, Michigan Tool Co. 131
Connors Steel Division, H. K. Porter Company, Inc. 30
Cutler-Hammer, Inc. 94, 95

Delta Power Tool Division, Rockwell Manufacturing Co. 160
Deming Co., The 152
Detroit Steel Corporation 58
De Vlieg Machine Co. 28, 29
Drever Co. 111
Drop Forging Association 157

Eastern Stainless Steel 89
Electric Controller & Mfg. Division, Square D Co. ..... Inside Front Cover
Electric Furnace Co., The 91
Ex-Cell-O Corporation 6
Ex-Cell-O Corporation, Machinery Division .. 7

Fafnir Bearing Co., The 96
Federal Bearings Co., Inc., The 162

General Electric Co., Metallurgical Products Department 136, 137
Giddings & Lewis Machine Tool Co. 127, 128, 129, 130

Hayes, C. I., Inc. 85
Haynes Stellite Co., A Division of Union Carbide Corporation 36
Hevi-Duty Electric Co., A Division of Basic Products Corporation 57
Hyde Park Foundry & Machine Co. 161

Ingersoll Milling Machine Co., The .. Back Cover
Ingersoll Steel Division, Borg-Warner Corporation 3

Jeffrey Manufacturing Co., The 44
Johnson Steel & Wire Co., Inc. 32, 33

Kaiser Aluminum & Chemical Sales, Inc., Kaiser Refractories & Chemicals Division.. 125

La Salle Steel Co. 114, 115
Levinson Steel Co., The 123
Lindberg Engineering Co., Heat Treating Furnace Division 151

Maine Department of Economic Development 126
Metallurgical Products Department, General Electric Co. 136, 137
Michigan Tool Co., Cone-Drive Gears Division 131
Midland-Ross Corporation, Surface Combustion Division 77
Milwaukee Foundry Equipment Division, SPO, Inc. 155
Mobil Oil Co. 14, 15
Morgan Construction Co. 121
Morse Chain Co., A Borg-Warner Industry ..24, 25

National Carbon Co., Division of Union Carbide Corporation 22, 23
National Steel Corporation, Weirton Steel Co. Division 62
National Tube Division, United States Steel Corporation 46, 47
Norton Co., Behr-Manning Co. Division 45

Pangborn Corporation ..... Inside Back Cover
Park Drop Forge Co., The 112
Peterson Steels, Inc. 21
Philadelphia Gear Corporation 134
Pittsburgh Steel Co. 32, 33
Porter, H. K., Company, Inc., Connors Steel Division 30

Republic Steel Corporation 12, 13
Robbins & Myers, Inc., Hoist & Crane Division 105
Rockwell Manufacturing Co., Delta Power Tool Division 160
Roebling's, John A., Sons Division, The Colorado Fuel & Iron Corporation 51
Royal McBee, Data Processing Division 72
Ryerson, Joseph T., & Son, Inc. 8, 9

St. Joseph Lead Co. 71
Sandvik Steel, Inc. 4
Seaway Steel Corporation 132
SKF Industries, Inc. 2
Smith, A. O., Corporation 160
SPO, Inc., Milwaukee Foundry Equipment Division 155
Square D Co., Electric Controller & Mfg. Division ..... Inside Front Cover
Standard Oil Co. (Indiana) 108, 109
Surface Combustion, A Division of Midland-Ross Corporation 77

Tennessee Coal & Iron Division, United States Steel Corporation 17, 18, 19, 46, 47
Texaco, Inc. 34, 35
Textron, Inc., Amsler Morton Co. Division .. 20
Tinnerman Products, Inc. 86

Ulbrich Stainless Steels 139
Union Carbide Corporation, Haynes Stellite Division 36
Union Carbide Corporation, National Carbon Division 22, 23
Union Carbide Corporation, Union Carbide Metals Division 107
Union Carbide Metals Co., Division of Union Carbide Corporation 107
United States Steel Corporation, Subsidiaries 17, 18, 19, 46, 47
United States Steel Export Co. 17, 18, 19, 46, 47
United States Steel Supply Division, United States Steel Corporation 46, 47

Ward Steel Co. 84
Washington Steel Corporation 142
Wean Equipment Corporation 81
Weirton Steel Co., A Division of National Steel Corporation 62
Westinghouse Electric Corporation 122
Wheland Co., The 84
Whirl-Air-Flow 118
Whiting Corporation 11
Wright Hoist Division, American Chain & Cable Co., Inc. 50

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Table of Contents
Facing Inside Front Cover

Classified Advertising, Page 159

RED CIRCLE
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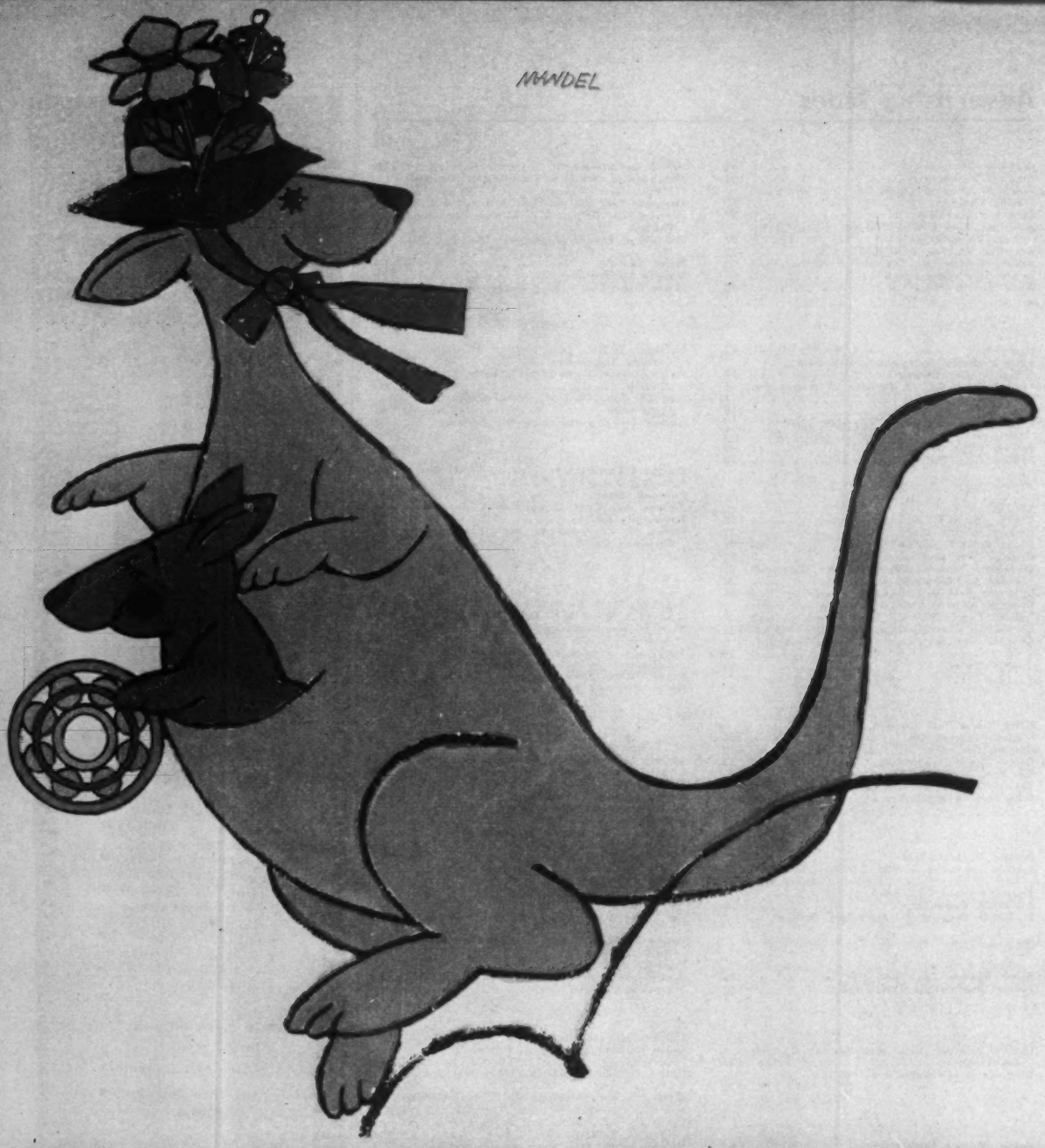
ALLOY-CHILLED
Hyde Park
RAMS
for all types of
HYDRAULIC
EQUIPMENT
Hyde Park Rams are available in Chilled or Alloy Iron.
Furnished in hardness range to meet your specification . . . ground to your required size.
On your next replacement of Rams—or for new equipment—consult us. Our engineers will be glad to assist you.
Red Circle Rolls for every Purpose
Rolling Mill Equipment
Gray Iron Castings up to 80,000 lb.



HIGHER SPEEDS

The raceway of a Federal Ball Bearing is designed to do just what its name implies—provide a track around which balls can whirl at lightning speeds, without fatigue. To make sure they do, every Federal Bearing starts with tough SAE 52100 steel. Scores of production and quality control steps later, a perfect ball bearing emerges, primed to perform its high speed tasks.

Smoothly. Quietly. Efficiently. And where do we send these smooth, quiet, efficient bearings? Our customer list is a veritable who's who of American industry. We'd like to include your name, too. Our catalog lists over 12,000 ball bearing sizes and hundreds of types. Send for it today.

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One of America's largest ball bearing manufacturers

FEDERAL ON FILM—A 16 mm. color sound film takes you through our 400,000 sq. ft. plant. Loaned free. Just ask for it.

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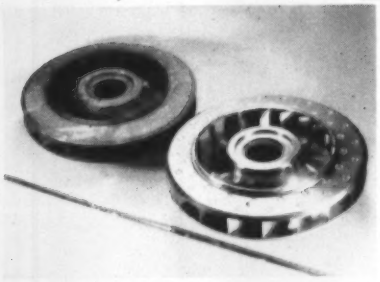
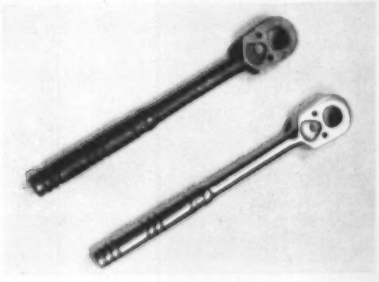
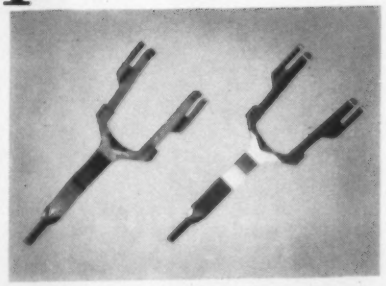
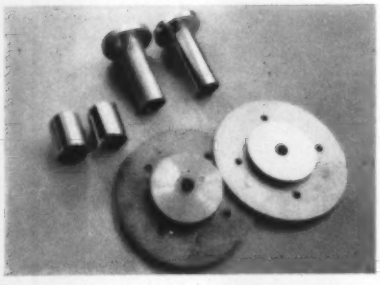
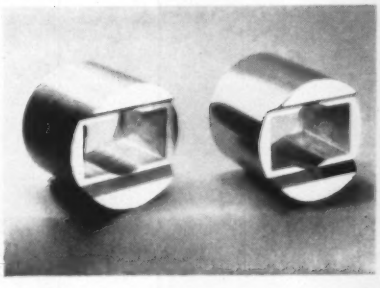
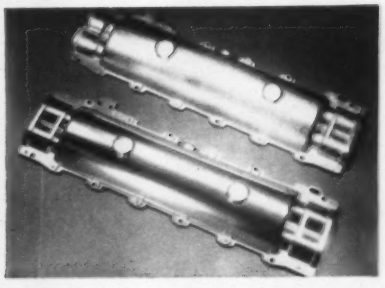

These photos prove it! Pangborn Vibratory Finishing gives the kind of finishing you never had before!

Pangborn Vibratory Finishing—culmination of years of experimentation and refinements*—is the newest method for cleaning, descaling, deburring, grinding, radiusing, fine-finishing, coloring and burnishing all metal and metal alloy parts, suitable plastic and ceramic items.

This unit gives you versatility of application, larger payloads and greatly-reduced time cycles resulting in tremendous savings. It easily handles parts too delicate or intricate to finish by other methods . . . shielded areas and interior surfaces . . . even coarser jobs faster and better.

In a wide range of sizes. Also auxiliary equipment, media and compounds for every need. Send parts with exact finish specifications, or finished specimen, for sample processing in our laboratory to: Mr. William E. Brandt, PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Maryland.

- Actually works up to 100 times faster than conventional methods; does more work better at lower cost
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* Pat. No. 2,422,786; June 24, 1947

Pangborn
OF HAGERSTOWN

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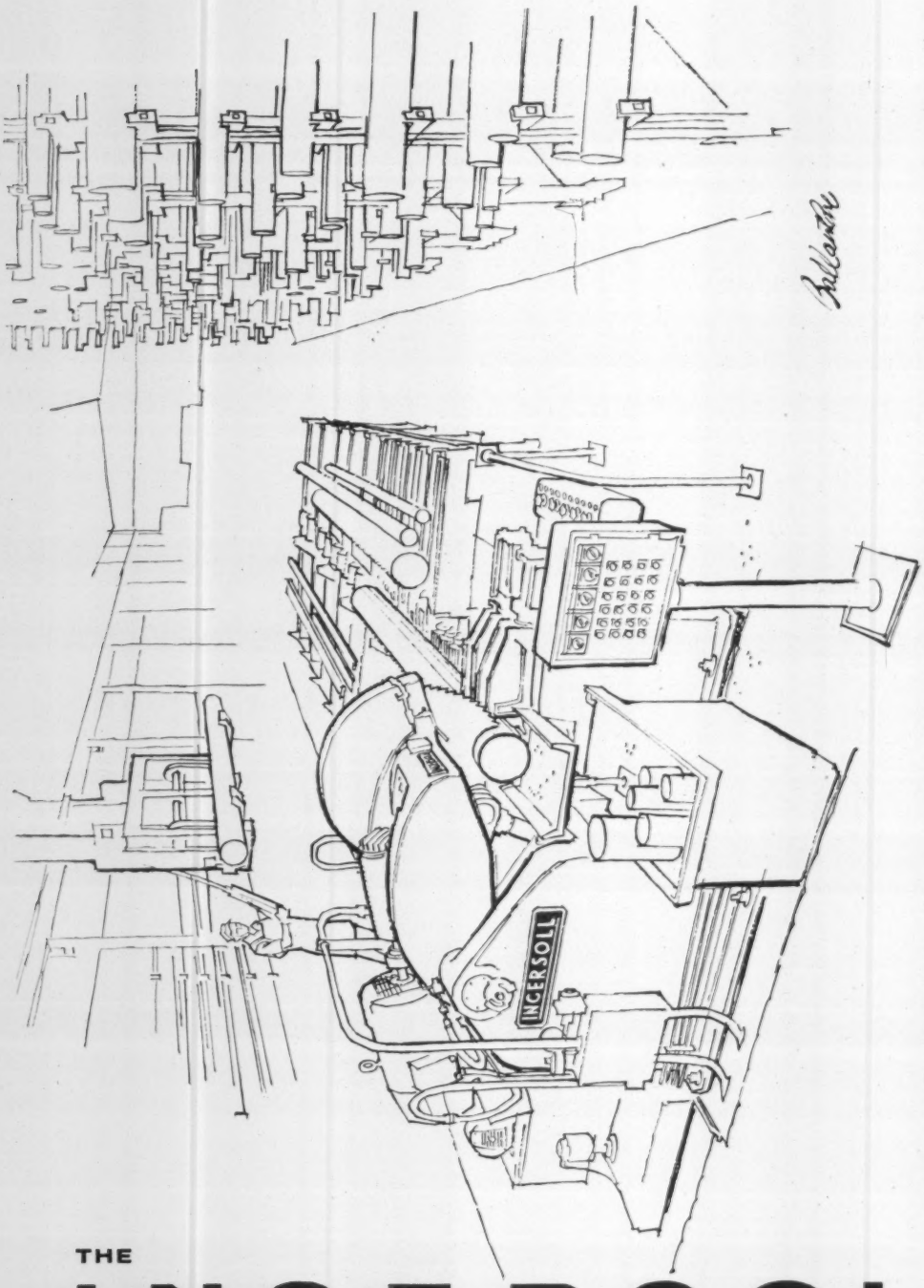
This is one of a number of

NEW INGERSOLL MACHINES

which will be operating on our erecting floors or in our own machine shops during the months just ahead.



A NEW SYSTEM FOR CUTTING BAR STOCK TO LENGTH: In Ingersoll's modernized cut-off department, one man on each shift not only loads and operates the saws but performs all of the other associated tasks as well. In addition to a new specially designed Ingersoll automatic saw, there are new storage racks and loading tables, a new stacker-type crane, an automatic saw sharpener, and automatic chip disposal facilities. Labor requirements have been halved, and work moves through the department in one-third the former time.

THE

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ROCKFORD, ILLINOIS